REMARKS

Claims 1-9 and 11-20 are all of the pending claims, with claims 1 and 14 being written in independent form.

I. Allowable Subject Matter:

At paragraph 4 of the Office Action, the Examiner indicates that claim 9 would be allowed if it were rewritten in independent form. Applicants do not rewrite claim 9 (as suggested by the Examiner) because claim 1 is believed to be patentable for the reasons discussed in detail below.

II. Claim Rejection on Prior Art Grounds:

The Examiner rejects claims 1-8 and 11-20 under 35 USC §102(b) as being anticipated by US 6,248,971 to Morel et al. ("Morel"). Applicants respectfully traverse this rejection in view of the following remarks.

As a preliminary matter, Applicants amend the specification and claims by rewriting the term "withdrawable part rack" in favor of "guide frame." This term substitution is not believed to introduce any prohibitive new matter because the German word "Einschubrahmen" as used in the original German text more correctly translates to term "guide frame." A guide frame (also known in the art "chassis") may be fixed in a switchboard cell and used for inserting a draw-out circuit breaker into the switchboard cell.

To demonstrate the practical and conceptual difference between a guide frame and a draw-out circuit breaker, Applicants enclose excerpts from a Siemens catalog and a Merlin Gerin catalog. The Siemens catalog illustrates an arrangement including a guide frame and a draw-out circuit breaker. For example, page 5-2 describes how the guide frame is attached with screws in a switchboard cell of a switchboard system. Pages 6-1 to 6-2 illustrate different positions that can be occupied by the draw-out circuit breaker during the insertion into the guide frame. The Merlin Gerin catalog also shows a guide frame into which a circuit breaker (or draw-out device) can be inserted (compare page 14).

A. Independent Claim 1:

As pointed in the February 14, 2007 Amendment, Applicants believe that claim 1 is patentable because it recites (among other things) that the bearing element of the switching gas damper is "fixed on a guide frame," which accommodates a power circuit breaker (and which is a separate and distinct element from the circuit breaker).

In contrast, and with reference to Fig. 3 of Morel, the external wall 56 (compared by the Examiner to the claimed "bearing element") is a constituent element of the arc-quenching chamber 26. In this regard, Morel teaches nothing more than an arc-quenching chamber 26, all of the components of which being mounted on the circuit breaker 10 itself. This has nothing whatsoever to do with mounting a bearing element (of a switching gas damper) on a guide frame, which is separate and distinct from the power circuit breaker, as claimed.

B. Independent Claim 14:

Independent claim 14 is somewhat similar to claim 1 to the extent that claim 14 also recites that the bearing element of the switching gas damper is "fixed on a guide frame." Accordingly, Applicants respectfully submit that claim 14 is patentable for reasons analogous to those noted above with respect to claim 1.

As demonstrated above, Morel's damping inserts are integrated into the circuit breaker itself, which has nothing whatsoever to do with fixing a bearing element on a guide frame, as recited in independent claims 1 and 14. Accordingly, Applicants respectfully request the Examiner to reconsider and withdraw the raised anticipation rejection.

CONCLUSION

Applicants earnestly request reconsideration and allowance of all of the pending claims.

Should there be any matters that need to be resolved in the present application, the Examiner is respectfully requested to contact the undersigned at the telephone number below.

The Commissioner is authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 08-0750 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

HARNESS, DICKEY & PIERCE, P.L.C.

By: _____

Ray Heflin, Reg. No. 41,060
P.O. Box 8910
Reston, VA 20195
(703) 668-8000

DJD/HRH/lmg

Enclosures: Siemens Catalog
Merlin Gerin Catalog

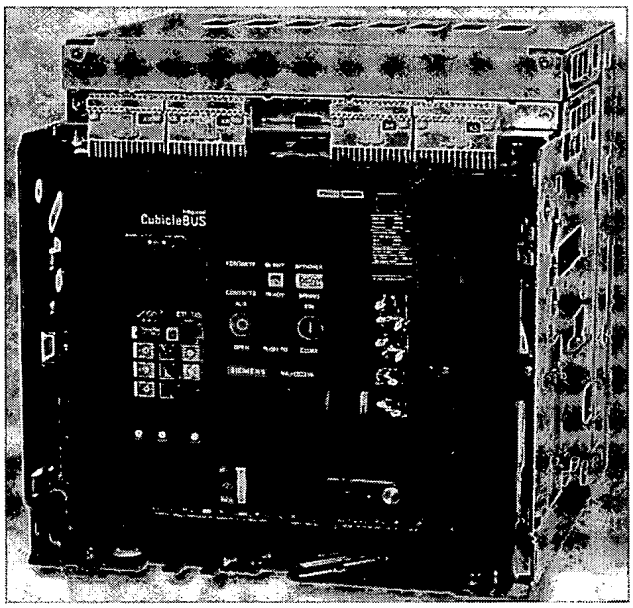
SIEMENS

Low Voltage Circuit Breaker
Leistungsschalter

WL Circuit Breaker

Operating Instructions / Betriebsanleitung Catalog No. / Bestell-Nr.: WLULOPMAN1

⚠ GEFAHR		⚠ DANGER
Gefährliche elektrische Spannung! **Kann Tod, schwere Personenschäden sowie Schäden an Geräten und Ausrüstung bewirken.** Vor dem Arbeiten an diesem Gerät, Anlage unbedingt spannungsfreischalten. Gefahr bei gespanntem Federspeicher! Federspeicher entspannen.	 	**Hazardous voltage!** **Will cause death, serious personal injury, or equipment / property damage.** Disconnect power before working on this equipment. Danger if spring is charged! Discharge spring.



Hinweis

Diese Betriebsanleitung enthält aus Gründen der Übersichtlichkeit nicht sämtliche Detailinformationen zu allen Typen des Produkts und kann auch nicht jeden denkbaren Fall der Aufstellung, des Betriebes oder der Instandhaltung berücksichtigen.

Sollten Sie weitere Informationen wünschen, oder sollten besondere Probleme auftreten, die in der Betriebsanleitung nicht ausführlich genug behandelt werden, können Sie die erforderliche Auskunft über die örtliche Siemens-Niederlassung anfordern.

Außerdem weisen wir darauf hin, dass der Inhalt dieser Betriebsanleitung nicht Teil einer früheren oder bestehenden Vereinbarung, Zusage oder eines Rechtsverhältnisses ist oder dieses abändern soll. Sämtliche Verpflichtungen von Siemens ergeben sich aus dem jeweiligen Kaufvertrag, der auch die vollständige und alleingültige Gewährleistungsregelung enthält. Diese vertraglichen Gewährleistungsbestimmungen werden durch die Ausführung dieser Betriebsanleitung weder erweitert noch beschränkt.

Die Bezeichnungen in dieser Dokumentation können Marken sein, deren Benutzung durch Dritte für deren Zwecke die Rechte der Inhaber verletzt.

NOTICE

These instructions do not purport to cover all details or variations in equipment, nor to provide for every possible contingency to be met in connection with installation, operation or maintenance.

Should further information be desired or should particular problems arise which are not covered sufficiently for the Purchaser's purposes, the matter should be referred to the local Siemens Sales Office.

The contents of this instruction manual shall not become part of or modify any prior or existing agreement, commitment or relationship. The sales contract contains the entire obligations of Siemens. The warranty contained in the contract between the parties is the sole warranty of Siemens. Any statements contained herein do not create new warranties or modify the existing warranty.

Designations in this documentation can be trade-marks. Use by third parties for their own purposes violates the owner's rights.

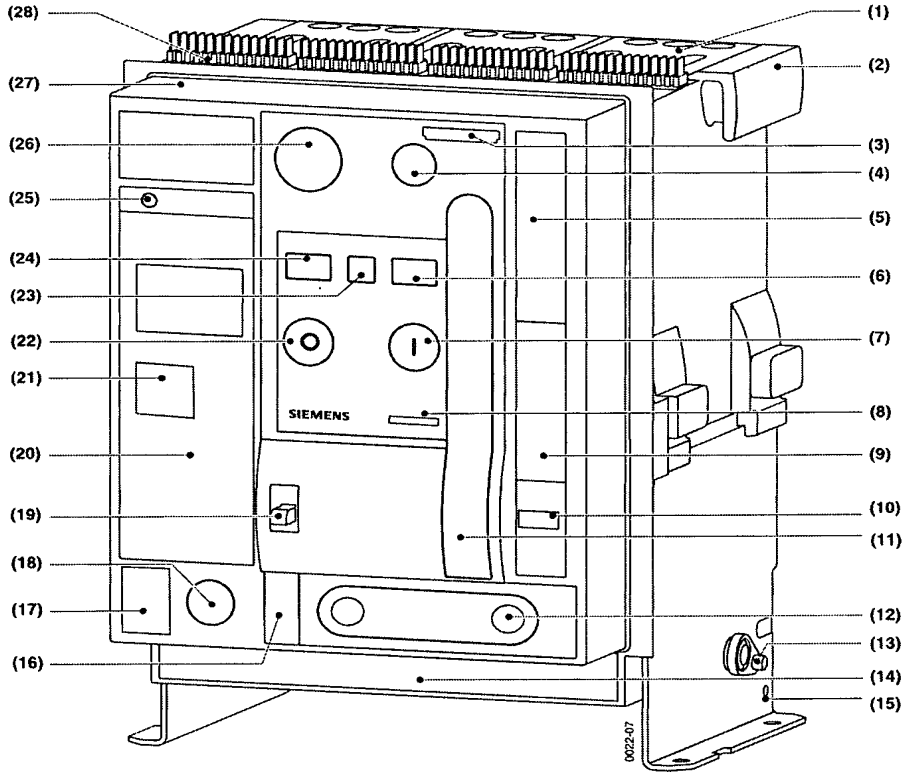
Symbole		**Symbols**
	Sichtprüfung	Visual examination
	Haken	hook
	Schlitzschraubendreher	Slotted-type screwdriver
	Kreuzschlitzschraubendreher Philips (PH), PoziDriv (PZ)	Cruciform screwdriver Philips (PH), PoziDriv (PZ)
	Torx-Schraubendreher (T)	Torx screwdriver (T)
	Innensechskant-Schraubendreher	Hexagon socket screwdriver
 **10 Nm** **89 lb-in**	Anzugsdrehmoment	Tightening torque
	Kabelbinder	Cable tie
	Handschriftlich ergänzen	Add in writing
1	Erster Schritt einer Handlungsabfolge	First step of action sequence

Inhalt

Contents

1 Aufbau

1.1 Leistungsschalter



(1) Lichtbogenkammer → (Seite 24-5)
(2) Tragegriff
(3) Kennzeichnungsschilder
(4) Motorabstellschalter (Option) → (Seite 13-3) **oder** „Elektrisch EIN" (Option) → (Seite -5)
(5) Typschild Leistungsschalter → (Seite 2-1)
(6) Speicherzustandsanzeige → (Seite 6-6)
(7) Taster „Mechanisch EIN"
(8) Bemessungsnennstromangabe
(9) Einfahrpiktogramm
(10) Schaltspielzähler (Option)
(11) Antriebshandhebel → (Seite 6-4)
(12) Handkurbel
(13) Einschubtransportwelle
(14) Ausstattungsschild → (Seite 2-1)
(15) Erdungsanschluss → (Seite 5-29)
(16) Positionsanzeige → (Seite 6-2)
(17) Tabelle Erdschluss-Schutz → (Seite 9-24)
(18) Sicherheitsschloss Handkurbel (Option)
(19) Mechanische Entriegelung der Handkurbel (Option)
(20) Überstromauslöser → (Seite 9-1)
(21) Bemessungsnennstrommodul
(22) Taster „Mechanisch AUS" **oder** Pilzdrucktaster „NOT-AUS" (Option)
(23) Einschaltbereitschaftsanzeige → (Seite 6-6)
(24) Schaltstellungsanzeige → (Seite 6-6)
(25) Ausgelöst-Anzeige (Rücksetzknopf) → (Seite 6-8)
(26) Abschließvorrichtung „Sicheres AUS" (Option)
(27) Bedienpult
(28) Messerleiste für Hilfsstromanschlüsse

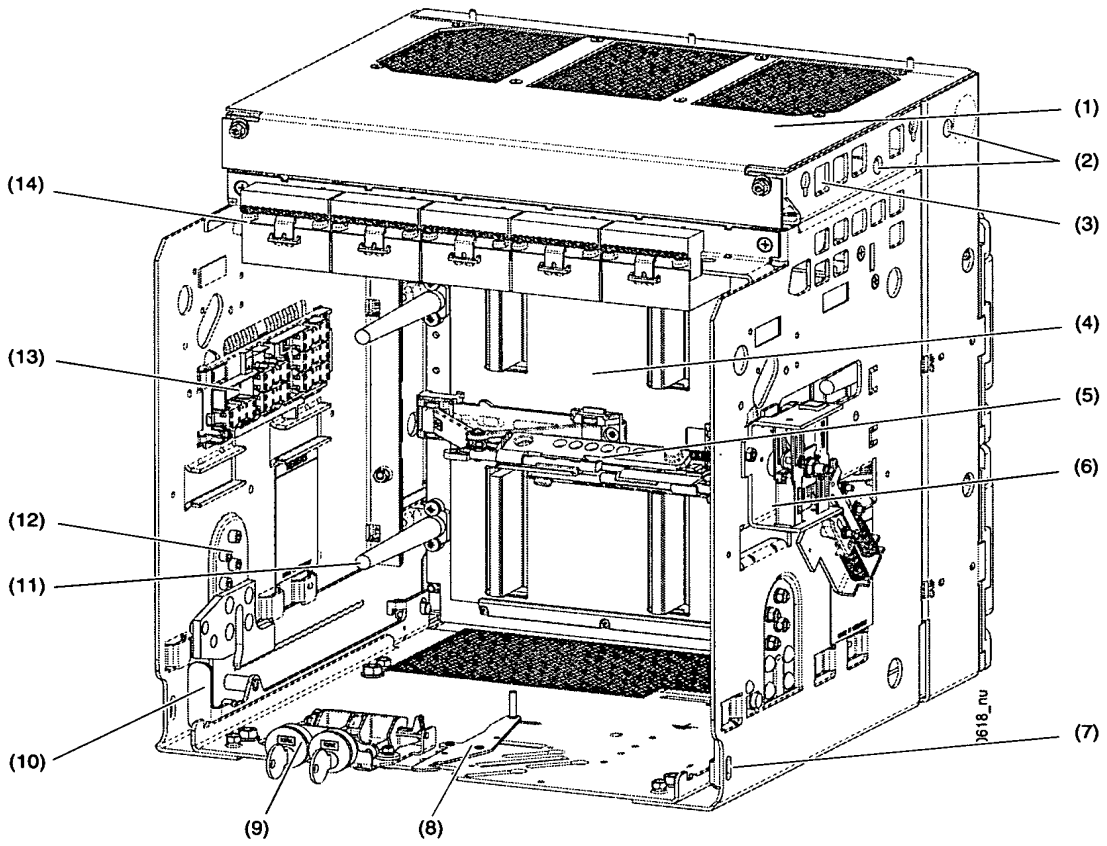
1 Design

1.1 Circuit breaker

(1) Arc chute → (page 24-5)
(2) Carrying handle
(3) Identification tags
(4) Motor disconnect switch (option) → (page 13-3) **or** "Electrical Closed" (option) → (page -5)
(5) Circuit breaker type label→ (page 2-1)
(6) Stored-energy indicator → (page 6-6)
(7) "CLOSE" button
(8) Ampere rating
(9) Racking pictogram
(10) Make-break operations counter (option)
(11) Spring charging lever → (page 6-4)
(12) Racking handle
(13) Draw-out unit transport shaft
(14) Options label → (page 2-1)
(15) Grounding terminal → (page 5-29)
(16) Position indicator → (page 6-2)
(17) Table for ground-fault protection → (page 9-24)
(18) Key lock for racking handle (option)
(19) Mechanical release of racking handle (option)
(20) Trip unit → (page 9-1)
(21) Rating plug
(22) "OPEN" button **or** "EMERGENCY OPEN" mushroom pushbutton (option)
(23) Ready-to-close indicator → (page 6-6)
(24) Circuit breaker OPEN / CLOSED indicator → (page 6-6)
(25) Tripped indicator (Reset button) → (page 6-8)
(26) Locking device "lock OPEN" (option)
(27) Front panel
(28) Secondary Disconnects

1.2 Einschubrahmen

1.2 Guide frame



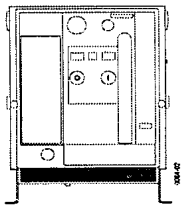
(1) Lichtbogenkammerabdeckung (Option)
(2) Öffnung für Kranhaken
(3) Ausblasöffnungen
(4) Shutter (Option)
(5) Abschließvorrichtung Shutter (Option)
(6) Gegenseitige mechanische Schalterverriegelung (Option)
(7) Abschließvorrichtung Verfahrschiene
(8) Türverriegelung Einschubrahmen (Option)
(9) Abschließvorrichtung in AUS-Stellung (Option)
(10) Verfahrschiene
(11) Shutterbetätiger (Option)
(12) Ausstattungsabhängige Kodierung (Option)
(13) Positionsmeldeschalter (Option)
(14) Schleifkontaktmodul Hilfsleiter (Anzahl ausstattungsabhängig)

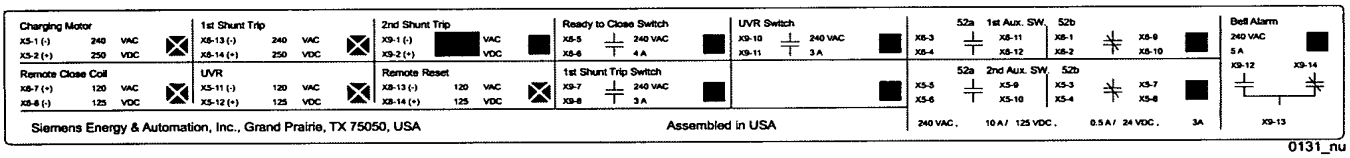
(1) Arc chute cover (option)
(2) Hole for crane hook
(3) Arc vent openings
(4) Shutter (option)
(5) Locking device shutter (option)
(6) Mutual mechanical circuit breaker interlocking (option)
(7) Locking device guide rail
(8) Door interlocking guide frame (option)
(9) Locking device in DISCONNECT position (option)
(10) Guide rail
(11) Shutter operating device (option)
(12) Rejection feature for misapllied frames (option)
(13) Position signaling switch (option)
(14) Secondary disconnects (quantity according to equipment)

2 Schilder

2.1 Ausstattungsschild Leistungsschalter

(Mit Anschlussbezeichnungen)





0131_nu

2.2 Typschild Grundschalter

2 Labels

2.1 Circuit breaker options label

(with terminal designations)

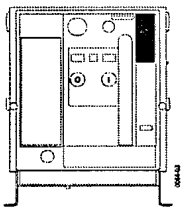
2.2 Type label circuit breaker frame

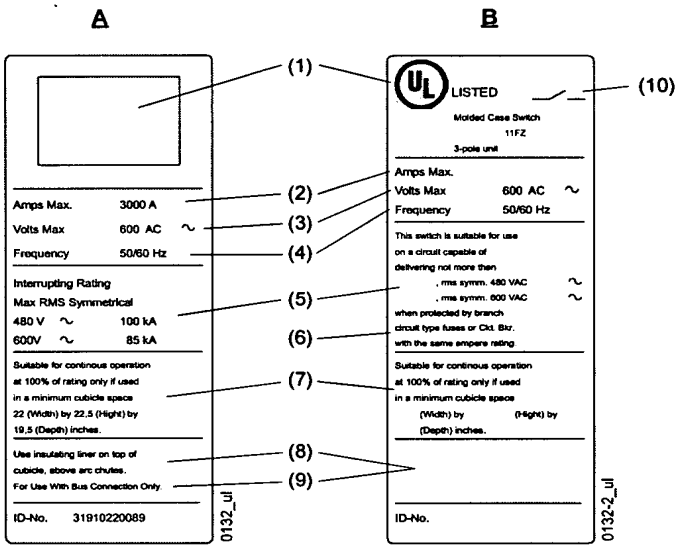
GEFAHR

Der Einsatz von Leistungsschaltern und deren Zubehör oberhalb ihrer Nennwerte kann zur Zerstörung von elektrischen Anlagen und zu Tod und schwerwiegenden Schädigungen des Betreiberpersonals führen.

WARNING

The use of circuit breaker and circuit breaker accessories above their ratings may cause death, severe injury or heavy damage of electrical equipment.

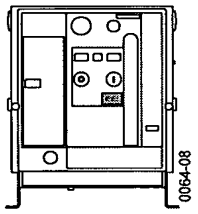




A **Leistungsschalter**
B **Trenner**
(1) Approbationszeichen (für Leistungsschalter mit einem weißen Aufkleber, wie gezeigt)
(2) Max. Bemessungsnennstrom
(3) Bemessungsbetriebsspannungen
(4) Bemessungsfrequenz
(5) Bemessungskurzschlussausschaltvermögen
(6) Erforderlicher Überstromschutz
(7) Einbauraum
(8) Ausblasraum
(9) Hauptanschlüsse
(10) Trennersymbol

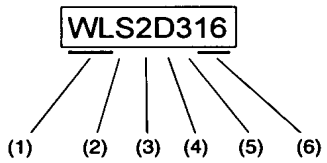
A Circuit breaker
B Non-automatic circuit breaker
(1) UL-Mark (for circuit breakers applied by a white sticker, within the shown frame)
(2) Max. Ampere rating
(3) Rated operating voltages
(4) Rated frequency
(5) Rated short-circuit breaking capacity
(6) Necessary overcurrent protection
(7) Enclosure size
(8) Arcing area
(9) Main connections
(10) Switch mark

2.3 Bezeichnung Grundschalter



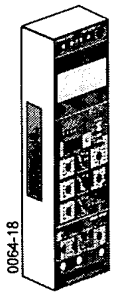
(1) Schaltertyp
(2) Schaltleistungsklasse
(3) Baugröße
(4) Einschub- oder Festeinbauschalter
(5) Polzahl
(6) Max. Bemessungsstrom

2.3 Frame designation



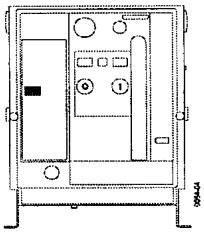
(1) Type of circuit breaker
(2) Siemens interrupting class
(3) Frame size
(4) Draw-out or fixed mounted circuit breaker
(5) No. of poles
(6) Maximum rated continuous current

2.4 Bezeichnung des elektronischen Überstromauslösers



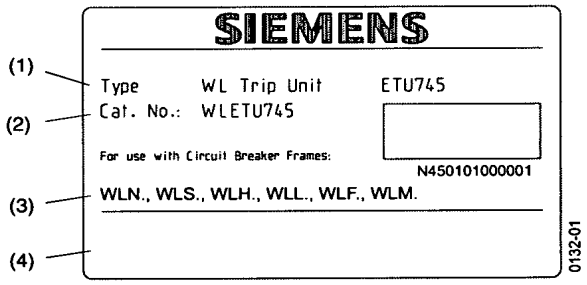
(1) Typ
(2) Bestell-Nummer
(3) Verwendbar in den angegebenen Schaltertypen
(4) Approbationszeichnen auf separatem Label

2.5 Schild Bemessungsnennstrommodul



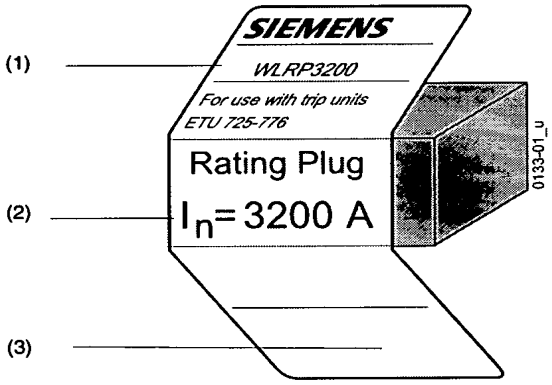
(1) Bestell-Nummer
(2) Bemessungsnennstrom des Leistungsschalters
(3) Approbationszeichen auf separatem Label

2.4 Trip unit designation



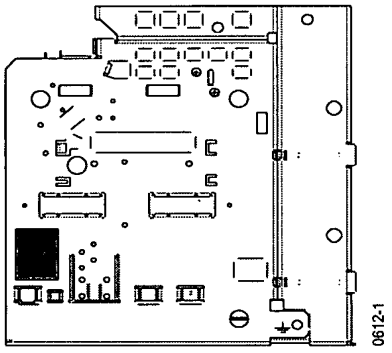
(1) Type
(2) Catalog number
(3) Can be used in the following types of circuit breakers
(4) Regulatory approvals on a separate label

2.5 Rating plug label



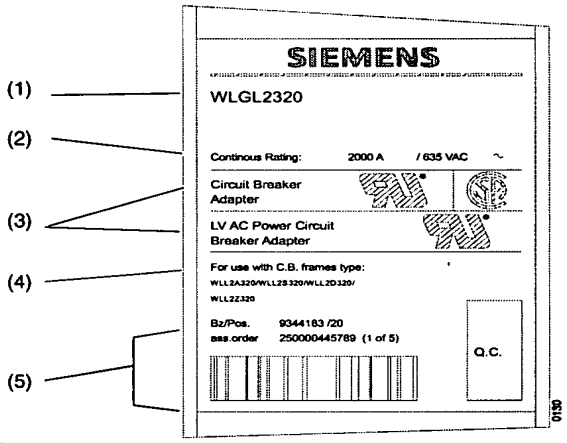
(1) Catalog number
(2) Ampere rating of the circuit breaker
(3) Regulatory approvals on a separate label

2.6 Typschild Einschubrahmen



(1) Bestell-Nummer
(2) Bemessungsnennstrom und Bemessungsisolationsspannung des Einschubrahmens
(3) Approbationszeichnen
(4) Einsetzbare Leistungsschalter
(5) Siemens interne Angaben

2.6 Guide frame rating label



(1) Catalog number
(2) Ampere rating and rated insulation voltage of the guide frame
(3) Regulatory approvals
(4) Circuit breakers that can be used with this guide frame
(5) Siemens internal data

3 Normen, Bestimmungen

3 Standard specifications

⚠ GEFAHR		⚠ WARNING
Gefährliche Spannung! **Verursacht Tod, ernste Verletzungen oder Zerstörung von Material / Eigentum.** Nur qualifiziertes Personal darf an dem Gerät arbeiten, welches mit den Warn-, Sicherheitshinweisen und Wartungsvorschriften vertraut gemacht wurde. Qualifiziertes Personal muss die Fähigkeit und die Erfahrung in der Bedienung von elektrischer Ausrüstung und Installation haben, sowie deren Konstruktion und Funktion kennen. Es muss Sicherheitslehrgänge bezüglich der Gefahren von elektrischen Geräten absolviert haben. Die erfolgreiche und sichere Funktion dieses Gerätes hängt von ordentlicher Bedienung, Installation, Behandlung und Wartung ab.	 	**Hazardous voltage!** **Will cause death, serious personal injury, or equipment/ property damage.** A qualified personnel should work on this equipment, after becoming thoroughly familiarwith all warnings, safety notices, and maintenance procedures contained herein and on the devices. A qualified person is one who has skills and knowledge related to the construction and operation of the electrical equipment and installations and has receved safety training on the hazards involved. This successful and safe operation of this equipment is dependant on proper handling, installation, operation and maintenance.

Qualifiziertes Personal

im Sinne dieser Betriebsanleitung bzw. der Warnhinweise auf dem Produkt selbst sind Personen, die mit Aufstellung, Montage, Inbetriebsetzung und Betrieb des Produktes vertraut sind und über die ihrer Tätigkeit entsprechenden Qualifikationen verfügen, wie z.B.:

a) Ausbildung oder Unterweisung bzw. Berechtigung, Stromkreise und Geräte/Systeme gemäß den Standards der Sicherheitstechnik ein- und auszuschalten, zu erden und zu kennzeichnen.
b) Ausbildung oder Unterweisung gemäß den Standards der Sicherheitstechnik in Pflege und Gebrauch angemessener Sicherheitsausrüstung.
c) Schulung in Erster Hilfe.

Qualified Personnel

For the purpose of this instruction manual and these product labels, a "qualified person" is one who is familiar with the installation, construction and operation of the equipment and the hazards involved.
In addition, he has the following qualifications:

a) Is trained and authorized to energize, de-energize, clear, ground and tag circuits and equipment in accordance with established safety practices.

b) Is trained in the proper care and use of protective equipment in accordance with established safety practices.

c) Is trained in rendering first aid.

Die Leistungsschalter sind für den Betrieb in geschlossenen Räumen bestimmt, in denen keine durch Staubentwicklung und ätzende Dämpfe oder Gase erschwerten Betriebsbedingungen vorliegen. Für staubige oder feuchte Räume sind entsprechende Kapselungen vorzusehen.

Der Leistungsschalter und die elektronischen Überstromauslöser entsprechen den Normen:

- UL 489
- CSA C22.2
- NMX-J-266-ANCE-2002

Der Einschubrahmen entspricht den Normen:

- UL 489
- CSA C22.2
- NMX-J-266-ANCE-2002

Die Zubehörteile entsprechen den Normen:

- UL 489
- NMX-J-266-ANCE-2002

Die Trennschalter entsprechen den Normen:

- UL 489
- NMX-J-266-ANCE-2002

The circuit breakers are suited for operation in enclosed spaces not subject to operating conditions aggravated by dust, caustic vapors or gases. Circuit breakers to be installed in dusty or damp locations must be appropriately enclosed.

The circuit-breaker frame and the trip units are in conformity with the standards:

- UL 489
- CSA C22.2
- NMX-J-266-ANCE-2002

The guide frame is in conformity with the standards:

- UL 489
- CSA C22.2
- NMX-J-266-ANCE-2002

The accessories are in conformity with the standards:

- UL 489
- NMX-J-266-ANCE-2002

The molded case switches are in conformity with the standards:

- UL 489
- NMX-J-266-ANCE-2002

4 Verpackung und Transport

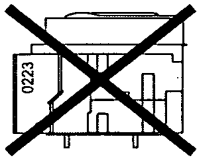
4.1 Überseeverpackung

Check humidity indicator Feuchtigkeitsanzeigeschild überprüfen		Further storage Weitere Lagerung
Pink Rosa	Blue Blau	Renew or dry moisture absorber Reseal the plastic sheeting Check packing on a regular basis Trockenmittel erneuern oder trocknen Kunststofffolie dicht verschweißen Verpackung regelmäßig überprüfen
Sealed packing defective Inspect circuit breaker for corrosion Notify damages to forwarding agent Dichteverpackung unwirksam Schalter auf Korrosionsschäden prüfen Schäden dem Transportunternehmen melden	Good Gut	

4.2 Auspacken

Schalter auspacken und auf Transportschäden untersuchen.

Bei späterem Einbau von Schalter oder Einschubrahmen: Lagerung und Weiterversand nur in der Originalverpackung.



VORSICHT	CAUTION
Schalter nicht auf die Rückseite legen!	Do not place circuit breaker on its rear side!

4.3 Gewichte

Frame Size / Baugröße		Weight / Gewicht		
	Circuit Breaker fixed mounted Festeinbauschalter	Drawout Circuit Breaker Einschubschalter	Guide Frame Einschubrahmen	Circuit Breaker + Guide Frame Schalter + Einschubrahmen
I 800 A / 1200 A	86 lb / 39 kg	137 lb / 62 kg	108 lb / 49 kg	245 lb / 111 kg
II 800 A / 1200 A	124 lb / 56 kg	159 lb / 72 kg	112 lb / 51 kg	271 lb / 123 kg
II 1600 A	124 lb / 56 kg	159 lb / 72 kg	112 lb / 51 kg	271 lb / 123 kg
II 2000 A	130 lb / 59 kg	177 lb / 80 kg	128 lb / 58kg	305 lb / 138 kg
II 2500 A / 3000 A	141 lb / 64 kg	209 lb / 95 kg	152 lb / 69 kg	361 lb / 164 kg
II C-class	148 lb / 67 kg	225 lb / 102 kg	159 lb / 72 kg	383 lb / 174 kg
III	181 lb / 82 kg	260 lb / 118 kg	306 lb / 139 kg	Only transport separately!
III C-class	200 lb / 90 kg	278 lb / 126 kg	306 lb / 139 kg	Only transport separately!

4 Packing and Transport

4.1 Overseas packaging

Check humidity indicator Feuchtigkeitsanzeigeschild überprüfen		Further storage Weitere Lagerung
Pink Rosa	Blue Blau	Renew or dry moisture absorber Reseal the plastic sheeting Check packing on a regular basis Trockenmittel erneuern oder trocknen Kunststofffolie dicht verschweißen Verpackung regelmäßig überprüfen
Sealed packing defective Inspect circuit breaker for corrosion Notify damages to forwarding agent Dichteverpackung unwirksam Schalter auf Korrosionsschäden prüfen Schäden dem Transportunternehmen melden	Good Gut	

4.2 Unpacking

Unpack the circuit breaker and inspect it for damage.

In case of later installation of the circuit breaker or guide frame: they may only be stored and redispatched in the original packing.

VORSICHT	CAUTION
Schalter nicht auf die Rückseite legen!	Do not place circuit breaker on its rear side!

4.3 Weights

Frame Size / Baugröße		Weight / Gewicht		
	Circuit Breaker fixed mounted Festeinbauschalter	Drawout Circuit Breaker Einschubschalter	Guide Frame Einschubrahmen	Circuit Breaker + Guide Frame Schalter + Einschubrahmen
I 800 A / 1200 A	86 lb / 39 kg	137 lb / 62 kg	108 lb / 49 kg	245 lb / 111 kg
II 800 A / 1200 A	124 lb / 56 kg	159 lb / 72 kg	112 lb / 51 kg	271 lb / 123 kg
II 1600 A	124 lb / 56 kg	159 lb / 72 kg	112 lb / 51 kg	271 lb / 123 kg
II 2000 A	130 lb / 59 kg	177 lb / 80 kg	128 lb / 58kg	305 lb / 138 kg
II 2500 A / 3000 A	141 lb / 64 kg	209 lb / 95 kg	152 lb / 69 kg	361 lb / 164 kg
II C-class	148 lb / 67 kg	225 lb / 102 kg	159 lb / 72 kg	383 lb / 174 kg
III	181 lb / 82 kg	260 lb / 118 kg	306 lb / 139 kg	Only transport separately!
III C-class	200 lb / 90 kg	278 lb / 126 kg	306 lb / 139 kg	Only transport separately!

4.4 Transport mit Kran

4.4 Transporting with a crane

⚠ GEFAHR

Schweres Gerät.

Falsches Kranen kann Tod, schwere Personenschäden sowie Schäden an Geräten und Ausrüstung bewirken.

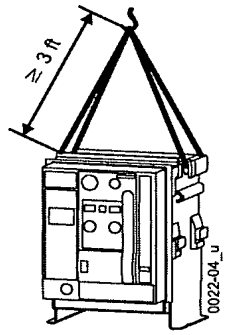
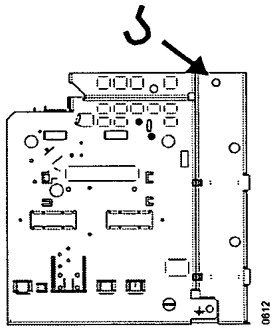
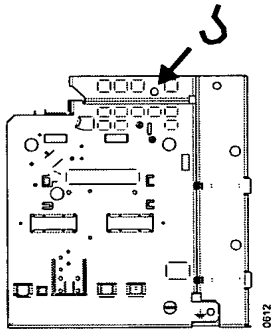
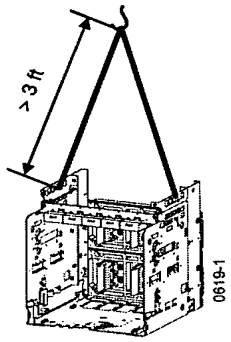
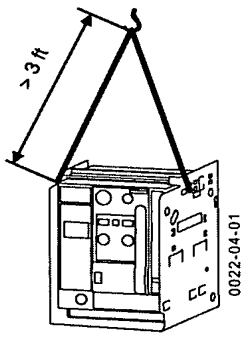
Niemals einen Leistungsschalter, Sicherungseinschub oder Einschubrahmen über Personen heben. Bedienungshinweise zum Kranen beachten. Nur OSHA/NIOSH geprüftes Krangeschirr verwenden. Benutze personelle Schutzausrüstung zum Heben oder Bewegen von Leistungsschaltern und Einschubrahmen.

⚠ DANGER

Heavy Equipment.

Improper lifting will cause death, serious personal injury, or equipment/property damage.

Never lift a circuit breaker, fuse carriage, or guide frame above personnel. Follow instructions for use of lifting bar assembly. Use OSHA/NIOSH approved rigging equipment and personal protection equipment for lifting/moving the circuit breakers and guide frames.

Circuit Breaker Schalter	Guide Frame Einschubrahmen	Circuit Breaker + Guide Frame Schalter + Einschubrahmen
 max. ∅ ½" rope / Schnur		
		

VORSICHT

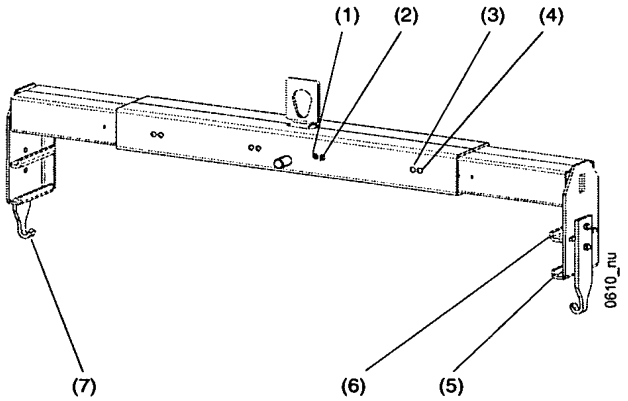
Für Baugröße III Einschubrahmen und Schalter nur getrennt transportieren!

CAUTION

For frame size III, the guide frame and the circuit breaker must be transported separately!

4.5 Transport mit Krantraverse

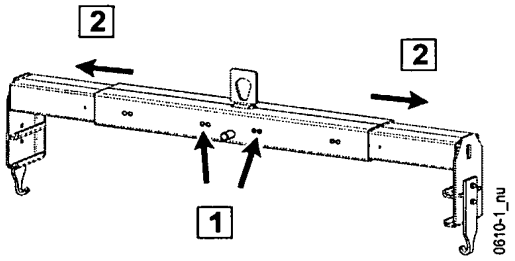
4.5.1 Krantraverse



(1) Arretierung für Schalter BG I / II
(2) Arretierung für Einschubrahmen BG I / II
(3) Arretierung für Schalter BG III
(4) Arretierung für Einschubrahmen BG I / II
(5) Aufnahme für Tragegriff des Schalters BG II / III
(6) Aufnahme für Tragegriff des Schalters BG I
(7) Haken für Einschubrahmen

Achtung	
Krantraverse links und rechts immer symmetrisch arretieren!	

4.5.2 Schalter transportieren



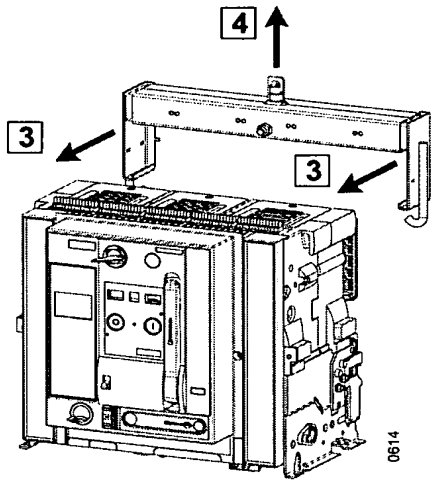
4.5 Transporting with crane

4.5.1 Lifting device

(1) Locking position for circuit breaker in frame size I / II
(2) Locking position for guide frame in frame size I / II
(3) Locking position for circuit breaker in frame size III
(4) Locking position for guide frame in frame size I / II
(5) Receptacle for circuit breaker carrying handle FS II / III
(6) Receptacle for circuit breaker carrying handle FS I
(7) Hook for guide frame

NOTICE	
Always lock the lifting device symmetrically on both sides!	

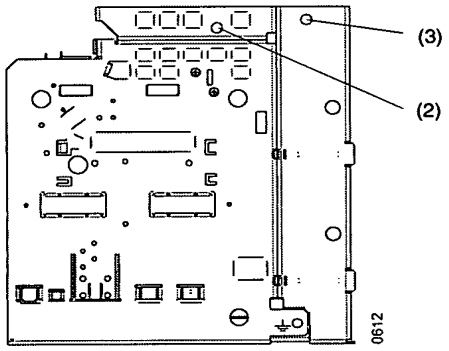
4.5.2 Transporting the circuit breaker

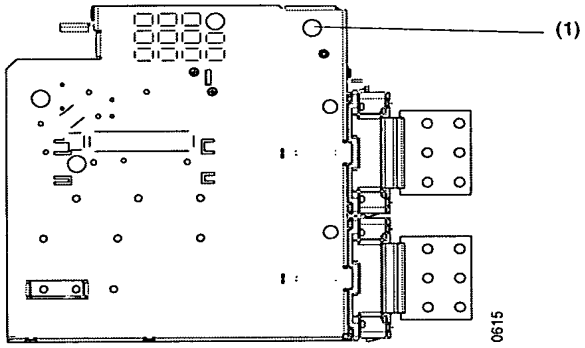


4.5.3 Einschubrahmen transportieren

VORSICHT		CAUTION
Für Baugröße III Einschubrahmen und Schalter nur getrennt transportieren!		For frame size III, the guide frames and the circuit breaker frames must be transported separatly.

Achtung	NOTICE
Krantraverse nur in die Transportöffnung einhängen, die der jeweiligen Ausführung entspricht!	Hook the lifting device only into the lifting eyes suitable for the specific versions!





(1) Transportöffnung für Einschubrahmen BG III ohne Schalter

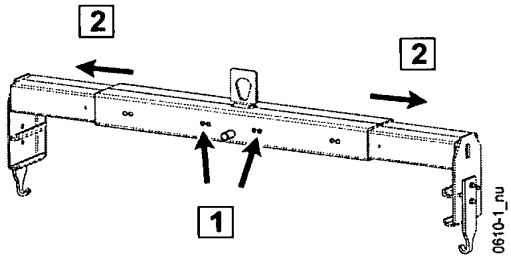
(2) Transportöffnung für Einschubrahmen BG II mit Schalter

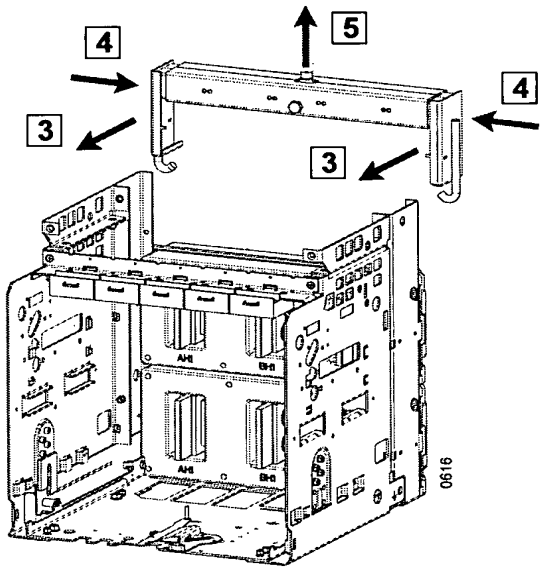
(3) Transportöffnung für Einschubrahmen BG II ohne Schalter

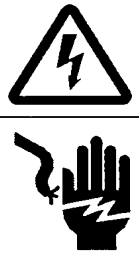
(1) Lifting eyes for guide frame in frame size III without circuit breaker

(2) Lifting eyes for guide frame in frame size II with circuit breaker

(3) Lifting eyes for guide frame in frame size II without circuit breaker





⚠ GEFAHR		⚠ DANGER
Gefährliche elektrische Spannung! **Kann Tod, schwere Personenschäden sowie Schäden an Geräten und Ausrüstung bewirken.** Vor Beginn der Arbeiten Anlage unbedingt spannungsfreischalten.		**Hazardous voltage!** **Will cause death, serious personal injury, or equipment / property damage.** Disconnect power before working on this equipment.

⚠ GEFAHR		⚠ DANGER
Schweres Gerät. **Falsches Kranen kann Tod, schwere Personenschäden sowie Schäden an Geräten und Ausrüstung bewirken.** Niemals einen Leistungsschalter, Sicherungseinschub oder Einschubrahmen über Personen heben. Bedienungshinweise zum Kranen beachten. Nur OSHA/NIOSH geprüftes Krangeschirr verwenden. Benutze personelle Schutzausrüstung zum Heben oder Bewegen von Leistungsschaltern und Einschubrahmen.		**Heavy Equipment.** **Improper lifting will cause death, serious personal injury, or equipment/property damage.** Never lift a circuit breaker, fuse carriage, or guide frame above personnel. Follow instructions for use of lifting bar assembly. Use OSHA/NIOSH approved rigging equipment and personal protection equipment for lifting/moving the circuit breakers and guide frames.

⚠ VORSICHT		⚠ CAUTION
Der Leistungsschalter ist nur im Zustand „Discharged" und „Open" zu installieren.		Circuit breaker has to be installed in „Discharged" and „Open" positions only

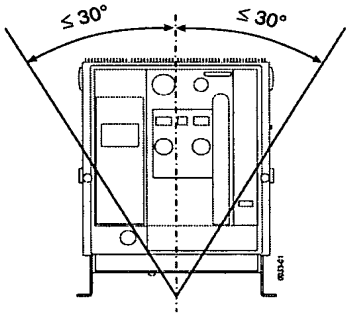
5.1 Einbau

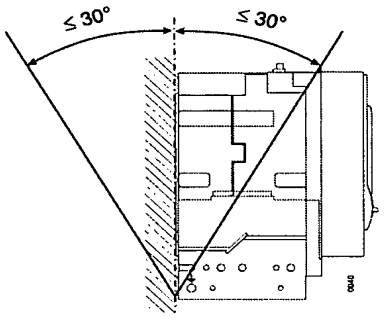
5.1.1 Einbaulage

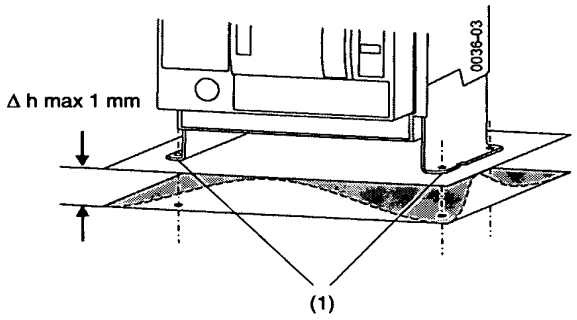
5.1 Mounting

5.1.1 Mounting position

VORSICHT	CAUTION
Wenn ein Schalter geneigt montiert ist, kann er auf den Schienen herausrutschen, wenn er in die Betriebsposition eingefahren wird.	Breaker mounted tilted towards the frontside: Breaker may slide out on rails, when racked in disconnect position.



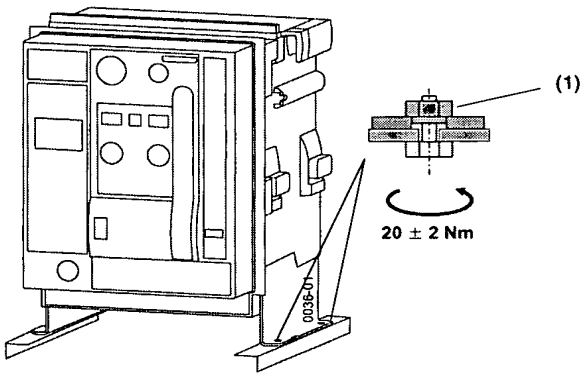




(1) Anschraubpunkte

(1) Fixing points

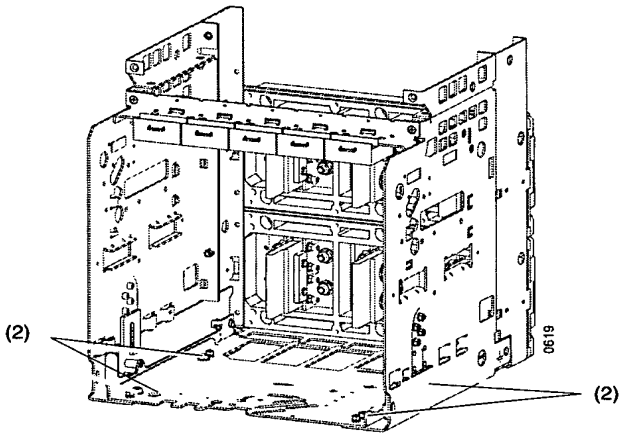
5.1.2 Einbau auf waagerechter Ebene



(1) Festeinbauschalter mit 4 Setzmuttern für:
BG I / II: Schrauben M8 + Scheiben Bestell-Nr. WLMETRC
BG III: Schrauben M10 + Scheiben Bestell-Nr. WLMETRC3
Alternativ mit Schrauben, Scheiben und Muttern:
BG I / II: M8 oder $^{5}/_{16}$"
BG III: M10 oder $^{3}/_{8}$"

(2) Einschubrahmen mit 4 Bohrungen für:
BG I: Senkkopfschrauben M6 oder 1/4" + Muttern + Spannscheiben
BG II / III: Schrauben M8 oder 5/16" + Muttern + Spannscheiben

5.1.2 Mounting on horizontal surface

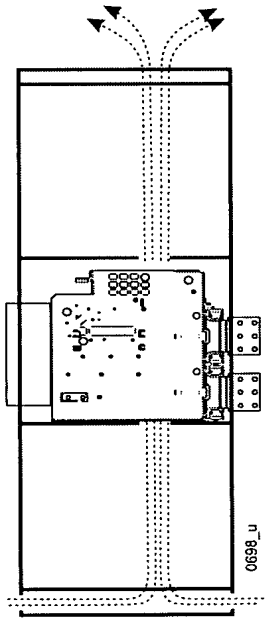


(1) Fixed mounted circuit breaker with 4 captive nuts for:
FS I / II: bolts M8 + washers kit catalog no. WLMETRC
FS III: bolts M10 + washers kit catalog no. WLMETRC3
Alternativly with bolts, washers and nuts:
FS I / II: $^{5}/_{16}$" / M8
FS III: $^{3}/_{8}$" / M10

(2) Guide frame with 4 holes for:
FS I: recessed head screws M6 or 1/4" + lock washers + nuts

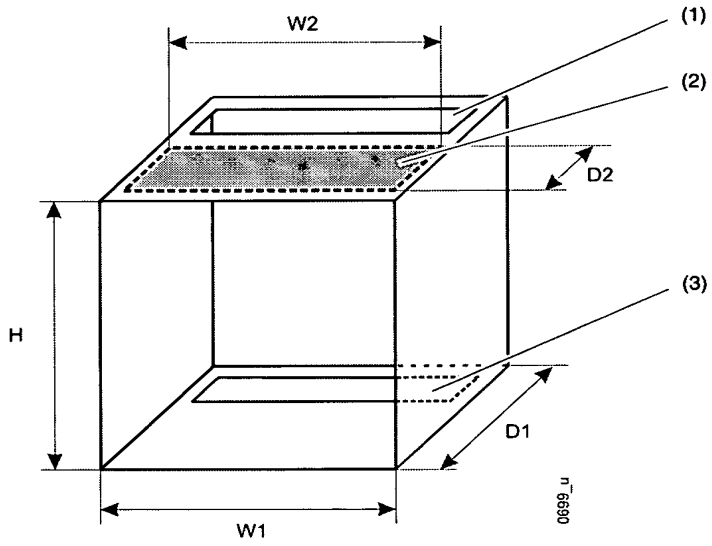
FS II / III: screws M8 or 5/16" + lock washers + nuts

5.1.3 Einbauraum und Belüftung



(1) Belüftungsöffnung oben
(2) Isolierplatte
z. B. NEMA GPO-3-Material, mind. 2,3 mm dick
(3) Belüftungsöffnung unten

5.1.3 Cubicle and ventilation



(1) Ventilation opening top
(2) Insulating liner
use NEMA GPO-3, min. 0.094" thick or comparable material
(3) Ventilation opening bottom

Frame size	Frame rating (A)	Interupting Class	Minimal cubicle dimensions			Insulating liner dimensions		Cubicle ventilation	
			Width W1 (inch)	Height H (inch)	Depth D1 (inch)	Width W2 (inch)	Depth D2 (inch)	Top (square inch)	Bottom (square inch)
I	800	S,H,L	22	15[1)]	19.5	18.5	10.5	not required	
	1200								
II	800	S, L	22	22.5[2)]	19.5	18.5	10.5		
	1200								
	1600								
	2000								
	2500								
	3000							55	55[3)]
III	4000	L	32	22.5[2)]	19.5	28.5	10.5	48 (2" by 24")	88[3)]
	5000								
	4000	C	32	30	19.5	28.5	10.5	48 (2" by 24")	88[3)]
	5000								

1) Die Gehäusehöhe ist angegeben mit Isolierplatte oben am Einbaufach oder der Einschubrahmen besitzt eine Standardabdeckung

2) Die Gehäusehöhe ist angegeben mit Isolierplatte oben am Einbaufach oder der Einschubrahmen besitzt eine optionale Abdeckung

3) Gewährleistet durch Öffnungen im Einschubrahmen

1) Cubicle height given for use with insulating liner on cubicle top or guide frames equipped with standard cover

2) Cubicle height given for use with insulating liner on cubicle top or guide frames equipped with optional cover

3) Provided by guide frame holes

5.1.4 Sicherheitsabstände / Ausblasraum

Generell:

Die Einbauraumabmessungen, die auf dem Typschild angegeben sind, stellen die nötigen Sicherheitsabstände gegen geerdete Metallflächen bis 600 V AC entsprechend UL 489 sicher.

Im Folgenden werden zusätzliche Richtlinien für Anwendungen ohne Einbauraumabgrenzungen, wie Einbaufächer, oder zur Montage von zusätzlichen Teilen innerhalb des Einbaufaches angegeben.

Die Sicherheitsabstände zu spannungsführenden Teilen, geerdeten Metallteilen und nicht leitenden Teilen sind einzuhalten. Die Sicherheitsabstände sind angegeben für die Nennspannungen 480 V AC und 600 V AC. Unter Berücksichtigung der Verlustleistungen für eine ventilierte Schaltanlage wurde das minimale Einbauvolumen berechnet, beschrieben durch Höhe, Breite und Tiefe.

5.1.4.1 Festeinbauschalter

Mit anlagenseitigen Abschirmungen

Ohne Einbaufachtrennungen montierte Festeinbauschalter benötigen Abschirmungen. Die Schalter sind vorbereitet, um diese Abschirmungen aufzunehmen, z.B. Kragen, Rillen am Schaltergehäuse hinten.

Das Abschirmungsmaterial soll der Materialkategorie NEMA GPO-3 bei minimaler Dicke von 0,094" entsprechen. Die Abschirmungen sind durch Abstützungen oder Dicke so stabil auszuführen, dass die Isolierung durch die Druckwelle von Kurzschlussabschaltungen nicht vermindert wird.

5.1.4 Safety clearance / arcing space

Generally:

The cubicle sizes given on the nameplates will ensure the necessary clearances against grounded dead metal up to 600 V AC, according UL 489.

Additional guidelines for appliances without compartmentalization as cubicles or for positioning of parts within the cubicle are given below.

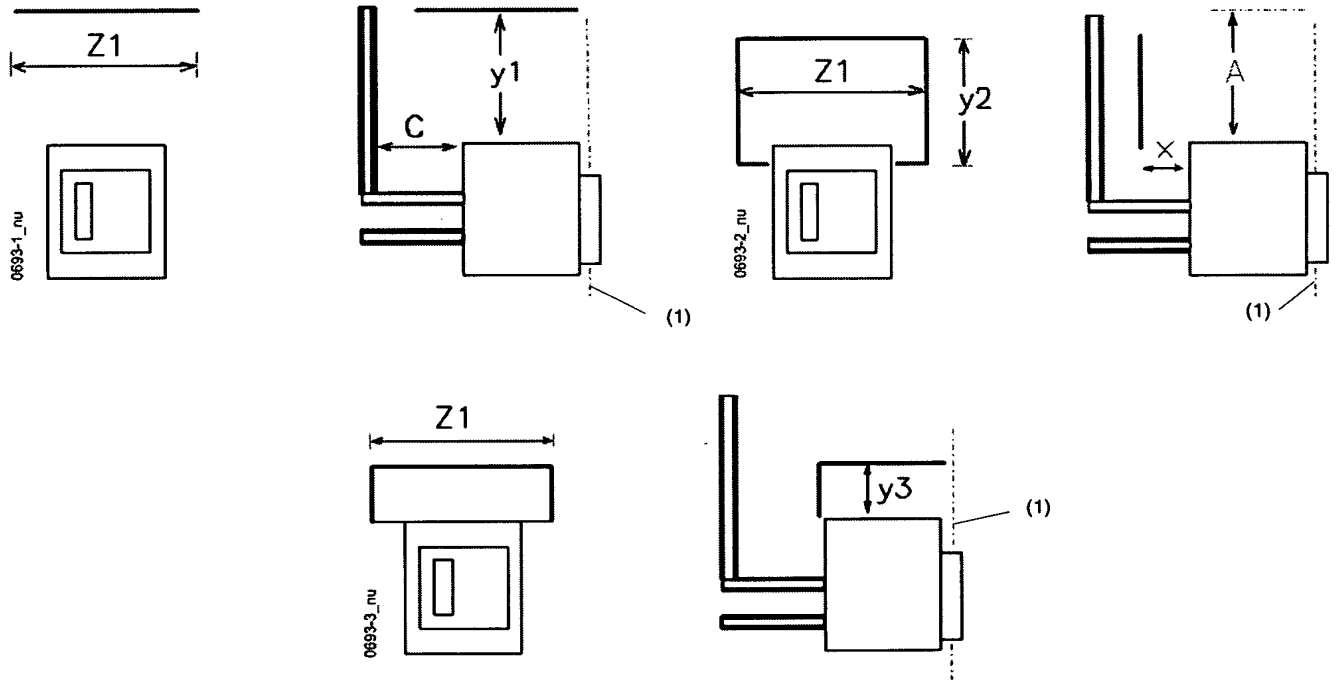
The clearances for live parts, metallic parts (grounded) or non-conductive materials have to be maintained. The required minimum safety clearances are specified for the rated voltages 480 V AC, 600 V AC. In consideration of the power loss requirements for a ventilated switchboard, the minimum volume is calculated based on the specified height, width and depth.

5.1.4.1 Fixed-mounted circuit breaker

With screens to be provided by the customers

Fixed-mounted breaker located without compartmentalization will need barriers. Provisions for alignment of these barriers are provided on the breaker housing (e.g. collars, groves).

The insulating screen material should be an insulating liner of NEMA GPO-3 material, min. thickness of 0.094" or comparable material. Screens will have to be supported or dimensioned stiff enough to ensure that impact due to gas exhaust during short circuit clearing will not damage the insulation.



1) Schaltschranktür
A Sicherheitsabstand siehe → (Seite 5-5)
C Sicherheitsabstand zur Schiene
X Montageabstand der Abschirmung
y1 Distanz zur Abschirmung
y2 Höhe der Abschirmung
y3 Höhe für Druckverteilung
Z1 Breite der Abschirmung

1) Switchboard door
A Safety clearance see → (page 5-5)
C Safety distance to the bus
X Installation distance of the barrier
y1 Distance of the barriers
y2 Height of the barriers
y3 Height for pressure dissipation
Z1 Width of the barriers

FS BG	Class Klasse	Dimensions for insulation barriers[1] Abmessungen für Abschirmungen aus Isolierstoff[1] (mm)											
		y1[2]		Z1		C		y2[2]		X		y3[2]	
Operating voltage Nennspannung (V)		480	600	480	600	480	600	480	600	480	600	480	600
I	S	60	60	470	470	25	125	100	100	0	0	60	80
	H								125			80	
	L						140		150				120
II	S	60	60	470	470	25	125	100	100	0	0	60	80
	L	100	100				140		150			150	150
III	L	100	100	470	470	25	125	100	150	0	0	150	150
	C	300	300			100	140	300	300			400	400

1) Gilt nur für nominale Einbaubreite!
BG I, II: 22"
BG III: 32"

2) Gemessen von der Oberkante der Lichtbogenkammer

1) Valid with nominal cubicle width only!
FS I, II: 22"
FS III: 32"

2) Measured from top surface of arc chutes

FS BG	Class Klasse	Dimensions for dead metal barriers[1] Abmessungen für geerdete Metallabdeckungen [1] (mm)									
		y1[2]		Z1		C		y2[2]		X[3]	
Operating voltage Nennspannung (V)		480	600	480	600	480	600	480	600	480	600
I	S	70	70	470	470	25	125	100	100	0	0
	H	100	125						125		
	L						140		150		
II	S	100	100	470	470	25	125	100	100	0	0
	L	125	125			25	140		150		
III	L	125	125	470	470	25	125	100	150	0	0
	C	300	300			100	140	300	300	Nicht möglich Not possible	

1) Gilt nur für nominale Einbaubreite!
BG I, II: 22"
BG III: 32"

2) Gemessen von der Oberkante der Lichtbogenkammer

3) „0" ist gemessen von den runden Vorsprüngen an der Rückseite des Gehäuses

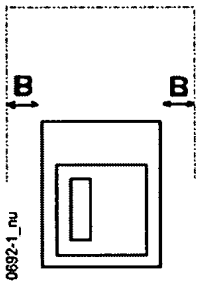
1) Valid with nominal cubicle width only!
FS I, II: 22"
FS III: 32"

2) Measured from top surface of arc chutes

3) "0" means barrier aligned to the round housing protrusions in the back of it

5.1.4.2 Einschubschalter

Ohne Lichtbogenkammerabdeckung

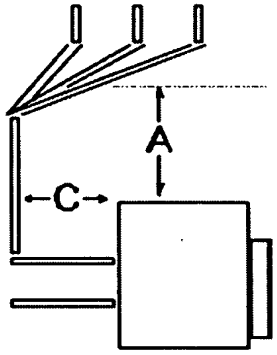


A Vertikaler Sicherheitsabstand
B Seitlicher Sicherheitsabstand
C Rückseitiger Sicherheitsabstand

BG I ist standardmäßig mit einer Lichbogenkammerabdeckung ausgestattet.

5.1.4.2 Draw-out circuit breaker

Without arc chute cover



A Minimum vertical clearance
B Minimum clearance on either side
C Minimum horizontal clearance to the rear

FS I will have an arc chut cover as standard.

FS BG	Class Klasse	Dimensions Abmessungen (mm)											
		A[1]				B				C			
		u		v, c		u[2]		v, c		u[2]		v, c	
Operating voltage Nennspannung (V)		480	600	480	600	480	600	480	600	480	600	480	600
II	S	150	300	100	100	20	50	10	10	14	14	10	10
II	L	250	600	100	100	50	100	10	10	14	30	10	10
III	L	75	500	100	100	50	100	10	10	14	14	10	10
III	C	300	600	300	300	100	100	20	20	20	30	20	20

1) Gemessen von der Oberkante der Lichtbogenkammer
2) Gilt nur für freien Ausblasraum nach oben!

u Sicherheitsabstand zu spannungsführenden Teilen
v Sicherheitsabstand zu geerdeten Metallteilen
c Sicherheitsabstand zu nichtleitenden Teilen

1) Measured from top surface of arc chutes
2) Valid with unblocked arcing space on top only!

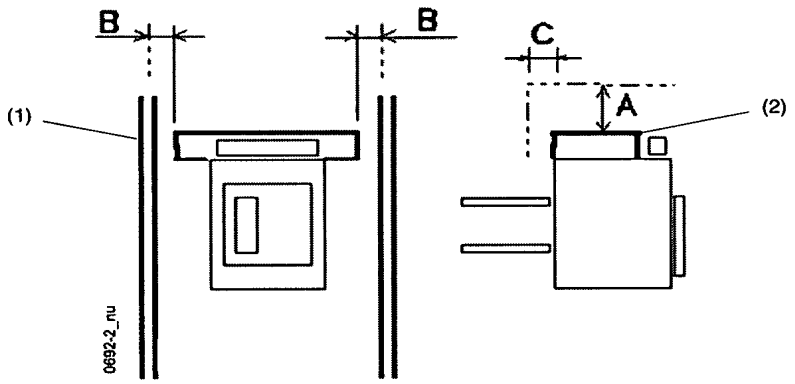
u Minimum clearance to live bus
v Minimum clearance to metallic / conductive parts
c Minimum clearance to insullated materials

Mit Lichtbogenkammerabdeckung

Lichtbogenkammerabdeckungen für Einschubschalter sind für alle Baugrößen erhätlich. Die Ausblasgase werden seitlich umgelenkt und durch seitliche Öffnungen entlassen. Diese Öffnungen in dem oberen Bereich der Seitenwände dürfen nicht blockiert werden. Ventilationsöffnungen im hinteren oberen Bereich der Abdeckung sind so platziert, dass keine Schaltgase nach oben austreten.

With arc chute cover

Arc chute covers for draw-out cradles are options for every frame size. The gases are directed to the side outlets of the cradle. Openings to the outside provided on the sides of the cradle shall not be blocked. Openings on the rear top for ventilation purposes ensure that no harmful gas may escape upwards.



1) Schaltschrank
2) Lichtbogenkammerabdeckung
A Vertikaler Sicherheitsabstand
B Seitlicher Sicherheitsabstand
C Rückseitiger Sicherheitsabstand

1) Switchboard
2) Arc chute cover
A Minimum vertical clearance
B Minimum clearance on either side
C Minimum clearance to the rear

FS BG	Class Klasse	Dimensions Abmessungen (mm)											
		A[1]				B				C			
		u		v, c		u[2]		v, c		u[2]		v, c	
Operating voltage Nennspannung (V)		480	600	480	600	480	600	480	600	480	600	480	600
I	S	14	14	0	0	100	100	10	10	14	14	0	0
	H												
	L						225						
II	S	14	14	0	0	50	100	10	10	14	14	0	0
	L						225						
III	L	14	14	0	0	50	200	10	10	14	14	0	0

1) Gemessen von der Oberkante der Lichtbogenkammer

2) Öffnungen im oberen Bereich der Seitenwände dürfen nicht blockiert werden, Freiraum von 30 mm erforderlich.

u Sicherheitsabstand zu spannungsführenden Teilen
v Sicherheitsabstand zu geerdeten Metallteilen
c Sicherheitsabstand zu nichtleitenden Teilen

1) Measured from top surface of arc chutes

2) Openings in top of cradle side wall shall not be blocked, side clearance of 30 mm required.

u Minimum clearance to live bus
v Minimum clearance to metallic / conductive parts
c Minimum clearance to insullated materials

5.2 Anschluss-Schienen

Maße der Anschluss-Schienen für die einzelnen Baugrößen siehe → Baugrößen / Maßbilder (Seite 7-1).

Die Anzahl und Größe der Schienen, welche am Schalter angeschlossen sind, werden gewählt nach UL 891, um die Test Anforderungen nach UL 891 zu erfüllen. In Abhängigkeit von dem Bemessungsstrom, der durch das Bemessungsstrommodul definiert ist, können unterschiedliche Verschienungen in einer vorgegeben Rahmengröße verwendet werden.

Die Anschluss-Schienen sind vorgesehen für Schienenanschluss mit Lochmuster nach NEMA. (außer den Horizontalanschlüssen des Festeinbauschalters)

5.2.1 Horizontalanschlüsse

5.2 Main terminal bars

For the main terminal busbar dimensions for the individual frame sizes, refer to:
→ Frame sizes / dimension drawings (page 7-1)

The number and size of the bus bars, connected to the breaker, has to be choosen according UL 891 to meet the test requirements according UL 891. Depending on the rating current, defined by the rating plug, different bussing in a given frame size may be applicable.

The main terminal busbars are intended for busbar connection with single busbars with a NEMA hole pattern. (except horizontal terminals on fixed mounted circuit breaker)

5.2.1 Horizontal connections

Fixed Mounted Circuit Breaker Festeinbauschalter		Line/Load Side Terminal Busbars with rear horizontal connectors Anlagenseitige Anschluss-Schienen mit Horizontalanschlüssen		
Frame Size Baugröße	**I_{nmax}**	**Number of Busbars Anzahl der Schienen**	**Bus Bar Cross-section Querschnitt**	**Number of Bolt Holes Lochanzahl**
I	800 A / 1200 A	1 - 4	3" x ¼"	2[1]
II	800 A / 1200 A / 1600 A	1 - 4	4" x ¼"	3[1]
	2000 A			
	2500 A / 3000 A			
III	4000 A / 5000 A	2 - 6	5" x ¼"[2]	4[1]

1) Lochbild nicht entsprechend NEMA CC1.

2) Die Verwendung von Schienen 4" x ¼" ist möglich.

1) Hole pattern not according NEMA CC1.

2) Use of 4" x ¼" busbar is possible.

⚠ VORSICHT		⚠ CAUTION
Kabel nicht direkt an die horizontalen Anschlüsse des Leistungsschalters anschließen!		Do not connect cable lugs directly to the horizontal circuit breaker terminals!

5.2.2 Vertikalanschlüsse

5.2.2.1 Schienenanschlüsse

Draw-Out Circuit Breaker Einschubschalter		Line/Load Side Terminal Busbars Anlagenseitige Anschluss-Schienen		
Frame Size Baugröße	I_{nmax}	Number of Busbars Anzahl der Schienen	Bus Bar Cross-section Querschnitt	Number of Bolt Holes Lochanzahl
I	800 A / 1200 A	1 - 3	4" x ¼"[1]	4
II	800 A / 1200 A / 1600 A	1 - 3	4" x ¼"[1]	4
	2000 A	2 - 4		
	2500 A / 3000 A	3 - 5		
III	4000 A / 5000 A	5 - 7	5" x ¼"[2]	6

1) Die Verwendung von Schienen 2" x ¼" ist möglich.
2) Die Verwendung von Schienen 4" x ¼" ist möglich.

Fixed Mounted Circuit Breaker Festeinbauschalter		Line/Load Side Terminal Busbars with rear vertical connectors Anlagenseitige Anschluss-Schienen mit Vertikalanschlüssen		
Frame Size Baugröße	I_{nmax}	Number of Busbars Anzahl der Schienen	Bus Bar Cross-section Querschnitt	Number of Bolt Holes Lochanzahl
I	800 A / 1200 A	1 - 3	3" x ¼"[1]	2
II	800 A / 1200 A / 1600 A	1 - 3	4" x ¼"	2
	2000 A	2 - 4		
	2500 A / 3000 A	2 - 5		
III	4000 A / 5000 A	5 - 7	5" x ¼"[1]	6

1) Die Verwendung von Schienen 4" x ¼" ist möglich.

5.2.2.2 Festeinbauschalter mit Vertikaladapter ausstatten

⚠ GEFAHR

Gefährliche elektrische Spannung!

Kann Tod, schwere Personenschäden sowie Schäden an Geräten und Ausrüstung bewirken.

Vor dem Arbeiten an diesem Gerät, Anlage unbedingt spannungsfreischalten.

- Ausschalten und Federspeicher entspannen → (Seite 24-2)
- Festeinbauschalter ausbauen

5.2.2 Vertical connections

5.2.2.1 Bussing

1) Use of 2" x ¼" busbar is possible.
2) Use of 4" x ¼" busbar is possible.

1) Use of 4" x ¼" busbar is possible.

5.2.2.2 Attaching fixed-mounted circuit breaker with vertical adapter

⚠ DANGER

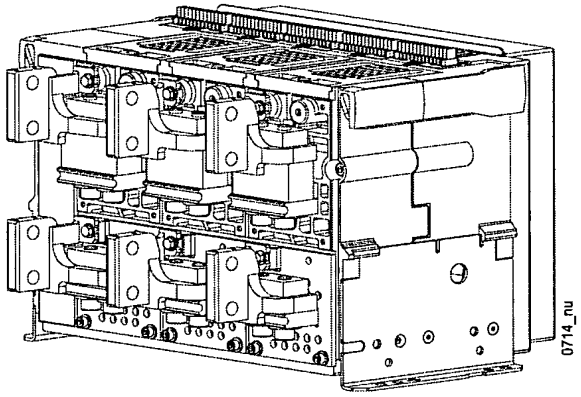
Hazardous voltage!

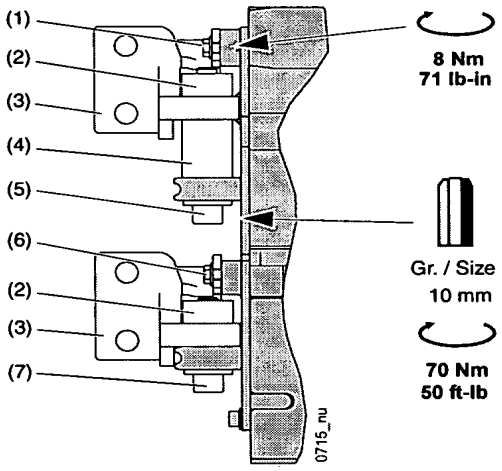
Will cause death, serious personal injury, or equipment / property damage.

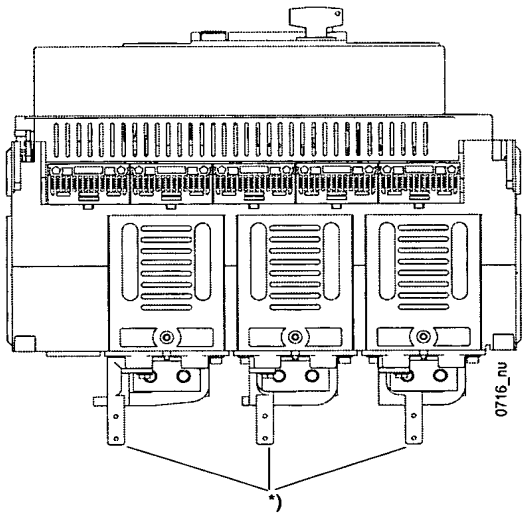
Disconnect power before working on this equipment.

- OPEN the circuit breaker and discharge the storage spring → (page 24-2)
- Remove fixed-mounted circuit breaker

ACHTUNG	NOTICE
Die Vertikaladapter der drei Pole sind unterschiedlich. Der Anbau muss wie unten gezeigt erfolgen.	Vertical bus connectors of the three poles are differently. Mounting so as shown below.







(1) Sechskantschraube M6x20
(2) Gewindeplatte 2xM12
(3) Vertikaladapter
(4) Zwischenstück
(5) Inbusschraube M12x90
(6) Sechskantschraube M6x35
(7) Inbusschraube M12x50

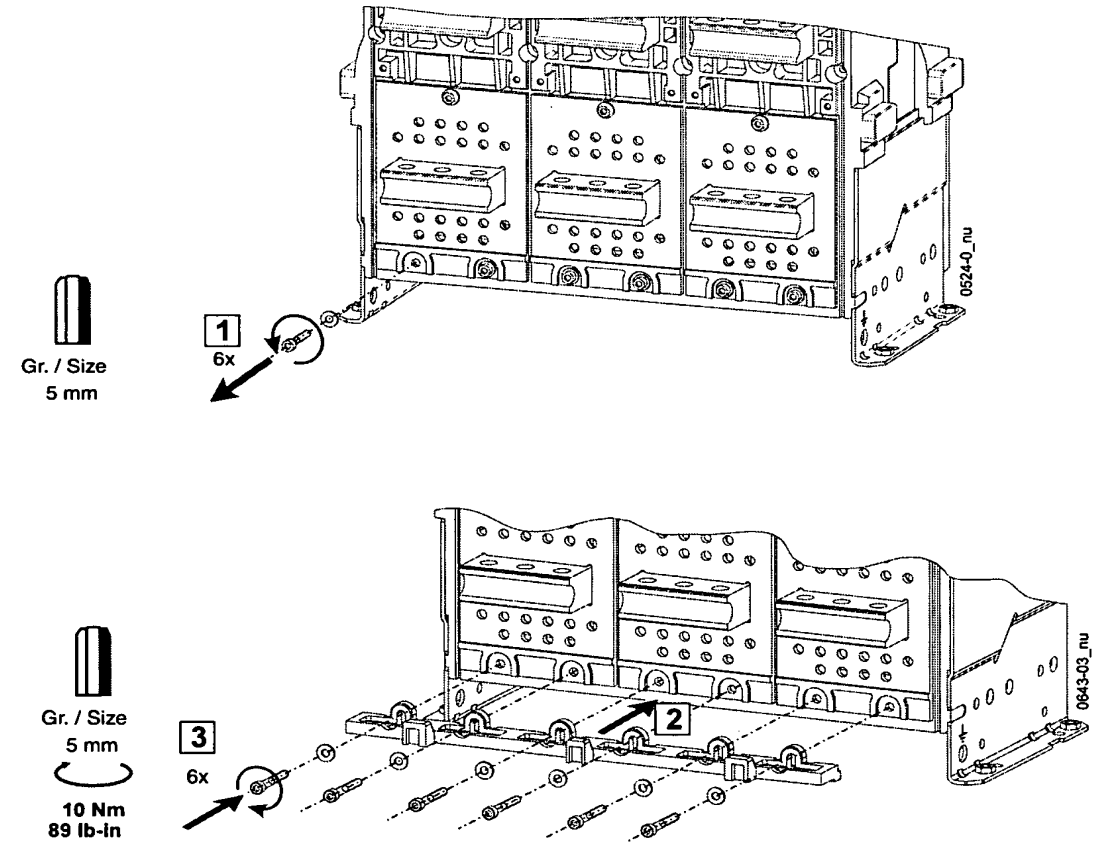
*) Unterschiedlicher Versatz

(1) Hexagon head screw M6x20
(2) Threaded plate 2xM12
(3) Vertical adapter
(4) Riser
(5) Socket screw M12x90
(6) Hexagon head screw M6x35
(7) Socket screw M12x50

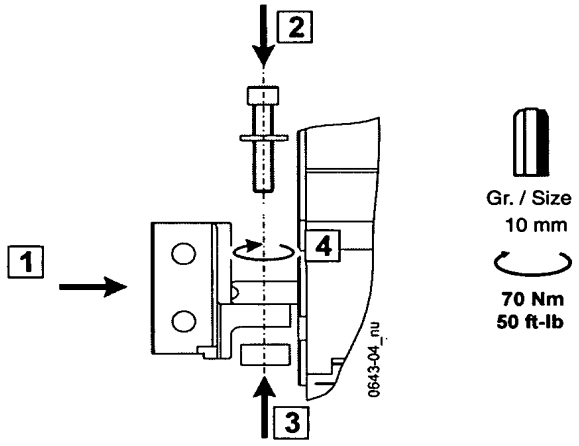
*) Different offset

Baugröße II **Frame size II**

Abstützung der unteren Kontakte anbauen **Installing support for the lower contacts**



Vertikaladapter anbauen **Attaching vertical adapter**

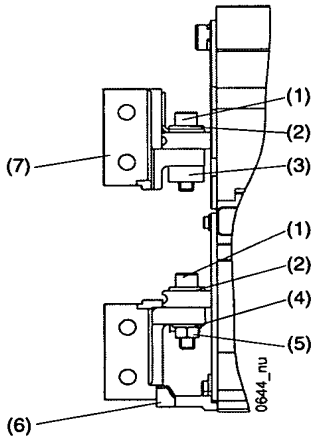


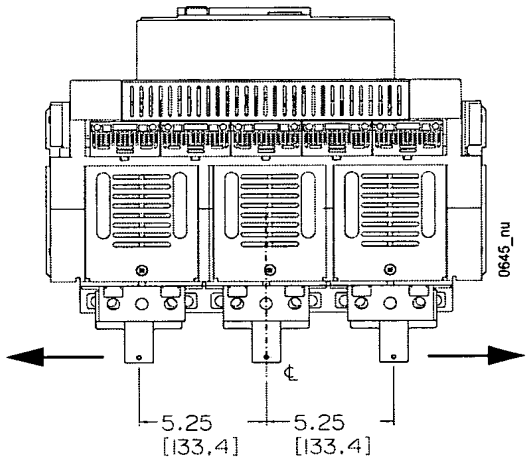
Ausrichten der Vertikaladapter

ACHTUNG
Die Vertikaladapter der Außenpole (Phase A und C) soweit nach außen schieben, wie es die Langlöcher des Vertikaladapters erlauben. Der Vertikaladapter des Mittelpols (Phase B) wird am Kupferanschluss des Gehäuses zentriert angebaut.

Alignment of vertical adapters

NOTICE
Shift the vertical adapters (7) of the outer poles (phase A & C) to the outward position as far as the shotted holes in the vertical adapters allow. Center the vertical adapter of the center pole (phase B) on the copper connector of the frame.





(1) Zylinderschraube
800 A, 1200 A, 1600 A: M12 x 50,
2000 A: M12 x 60,
3000 A: M12 x 90,
(2) Spannscheibe
(3) Gewindeplatte
(4) Scheibe
(5) 800 A, 1200 A, 1600 A, 2000 A: Mutter M12
3000 A: Gewindeplatte
(6) Abstützung
(7) Vertikaladapter

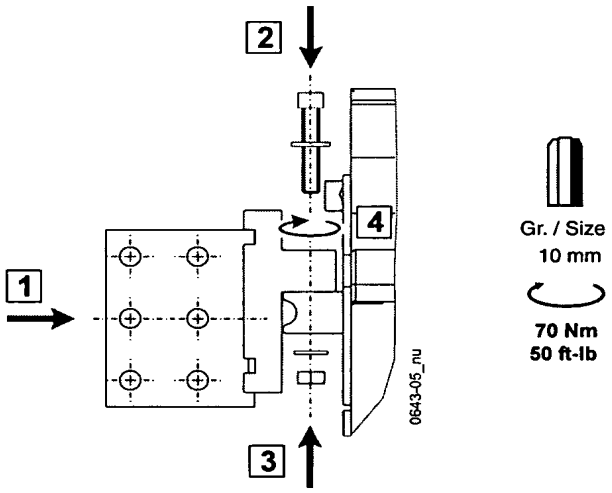
(1) Cheese-head screw
800 A, 1200 A, 1600 A: M12 x 50,
2000 A: M12 x 60,
3000 A: M12 x 90,
(2) Belleville washer
(3) Threaded plate
(4) Washer
(5) 800 A, 1200 A, 1600 A, 2000 A: M12 nut
3000 A: threaded plate
(6) Support
(7) Vertical adapter

Baugröße III

Frame size III

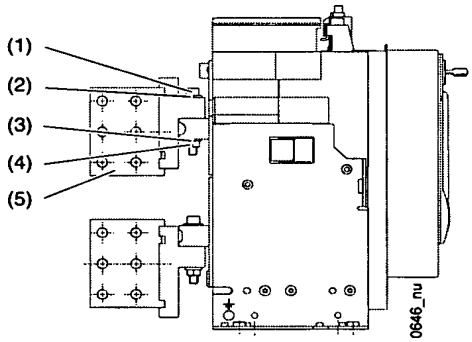
Vertikaladapter anbauen

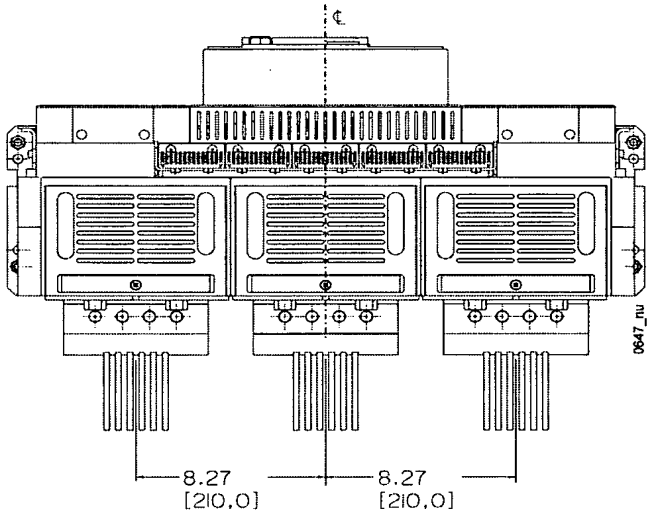
Attaching vertical adapter



Ausrichten der Vertikaladapter

Alignment of vertical adapters





(1) Zylinderschraube M12 x 90
(2) Spannscheibe
(3) Scheibe
(4) Mutter M12
(5) Vertikaladapter

(1) Cheese-head screw M12 x 90
(2) Belleville washer
(3) Washer
(4) M12 nut
(5) Vertical adapter

5.2.2.3 Bestell-Nummern

5.2.2.3 Catalog numbers

	Frame size Baugröße	Max. circuit breaker rated current Max. Bemessungsnennstrom $I_{n\,max}$ (A)	Catalog No. Bestell-Nr.
Set for 3 phases, load and line Satz für 3 Phasen, oben und unten	I	800 /1200	WLH1R12CONUL
Set for 1 phase, load and line Satz für 1 Phase, oben und unten	II	800 / 1200 / 1600	WLL2R16CONUL
		2000	WLL2R20CONUL
		2500 / 3000	WLL2R30CONUL
	II (C-class)	1600 / 2000 / 2500 / 3000	WLC2R30CONUL
	III	4000 / 5000	WLC3R50CONUL

5.2.3 Frontanschlüsse

5.2.3 Front connections

5.2.3.1 Schienenanschlüsse

5.2.3.1 Bussing

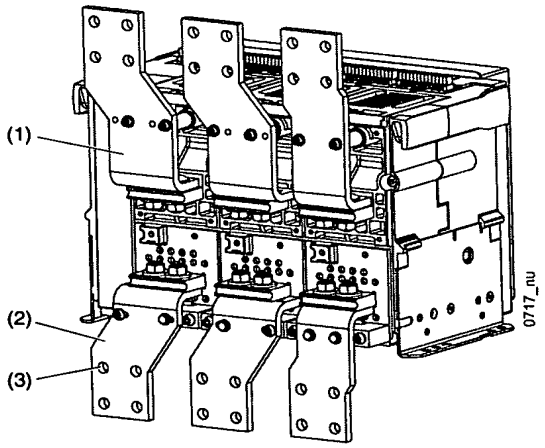
Fixed Mounted Circuit Breaker Festeinbauschalter		Line/Load Side Terminal Busbars with front connectors Anlagenseitige Anschluss-Schienen mit Frontanschlüssen		
Frame Size Baugröße	I_{nmax}	Number of Busbars Anzahl der Schienen	Bus Bar Cross-section Querschnitt	Number of Bolt Holes Lochanzahl
I	800 A / 1200 A	1 - 3	3" x ¼"	4
II	800 A / 1200 A / 1600 A	1 - 3	4" x ¼"	4
	2000 A	2 - 4		
	2500 A / 3000 A	2 - 5		
III	4000 A / 5000 A	5 - 7	5" x ¼"[1)]	6

1) Die Verwendung von Schienen 4" x ¼" ist möglich.

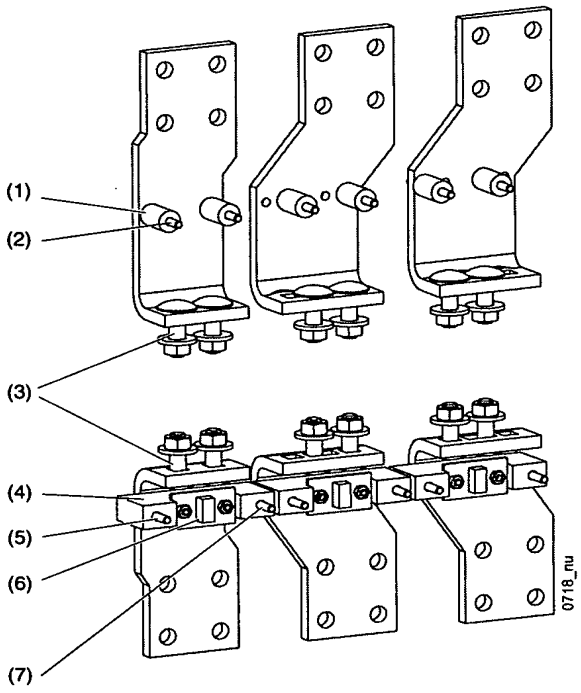
1) Use of 4" x ¼" busbar is possible.

5.2.3.2 Festeinbauschalter mit Frontanschlüssen ausstatten

Baugröße I



(1) Lange Anschlüsse oben
(2) Kurze Anschlüsse unten
(3) Bohrungen ∅ 13,5 mm



(1) Distanzhülse
(2) Innensechskantschraube ISO 4762 M6x55
(3) Flachrundschraube DIN 603 M12x40 mit Spannscheibe und Mutter
(4) Abstützung
(5) Innensechskantschraube ISO 4762 M6x60 mit Spannscheibe
(6) Lasche mit 2 Setzmuttern M6 für Sechkantschrauben ISO 4017 M6x50 mit Spannscheiben
(7) Innensechskantschraube ISO 4762 M6x70 mit Spannscheibe

5.2.3.2 Attaching fixed mounted circuit breaker with front connectors

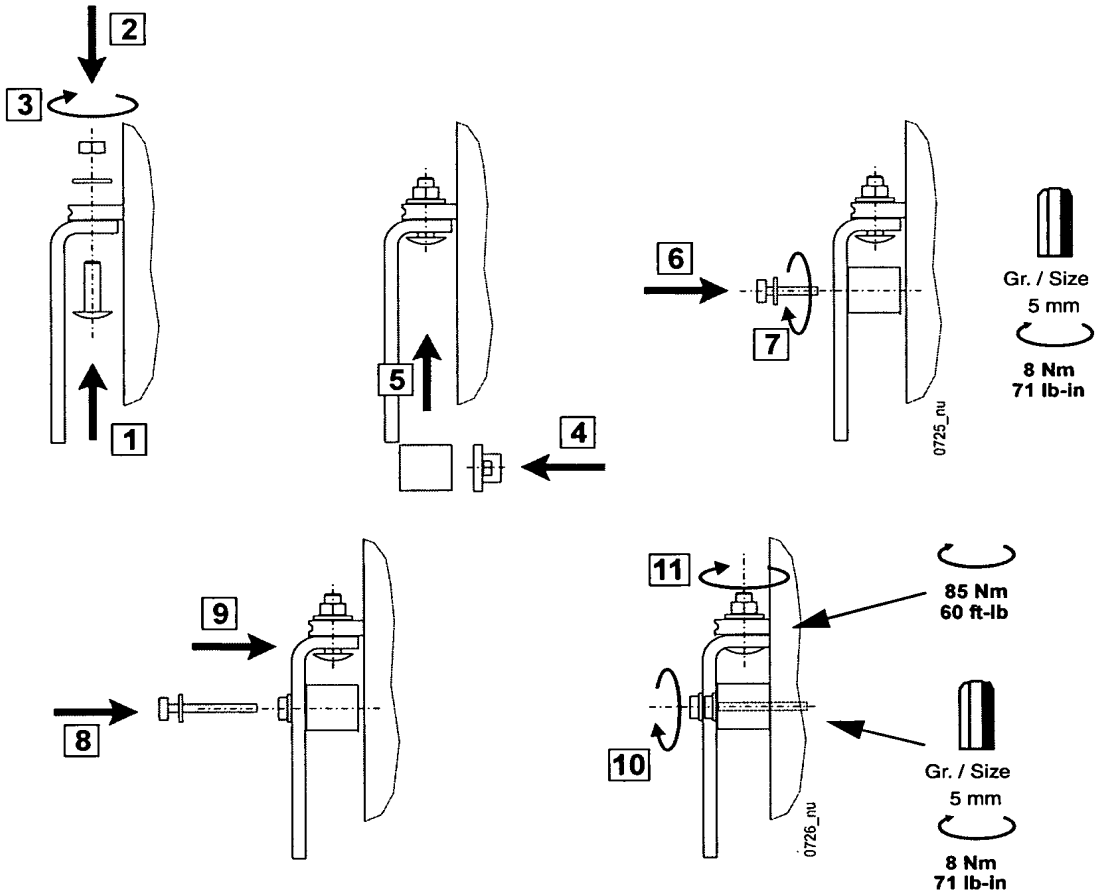
Frame size I

(1) Long connectors: line
(2) Short connectors: load
(3) Holes ∅ 13.5 mm

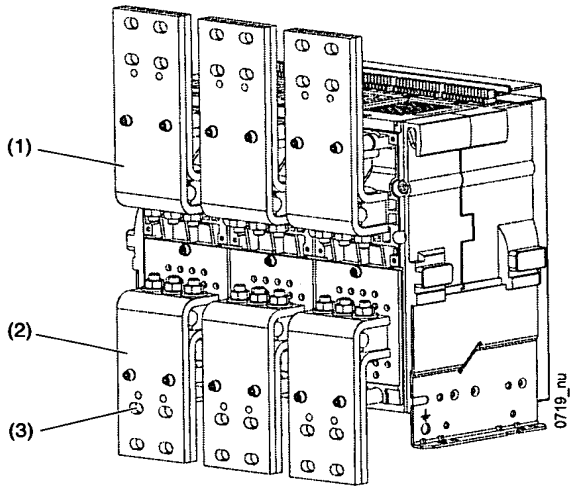
(1) Distance sleeve
(2) Socket head screw ISO 4762 M6x55
(3) Coach screw DIN 603 M12x40 with belleville washer and nut
(4) Support
(5) Socket head screw ISO 4762 M6x60 with belleville washer
(6) Bracket with 2 captive nuts M6 for hexagon head screws ISO 4017 M6x50 with belleville washers
(7) Socket head screw ISO 4762 M6x70 with belleville washer

Anbau (unterer Anschluss)

Mounting (load side)

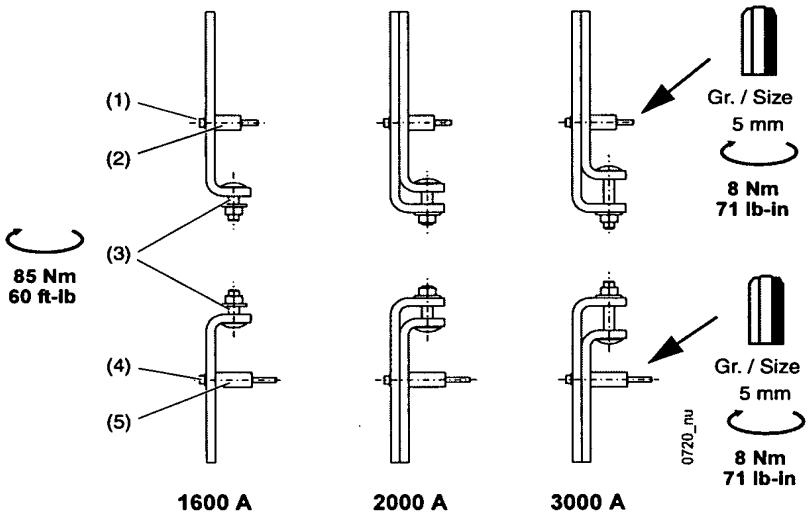


Baugröße II **Frame size II**



(1) Lange Anschlüsse oben
(2) Kurze Anschlüsse unten
(3) Bohrungen ∅ 13,5 mm

(1) Long connectors: line
(2) Short connectors: load
(3) Holes ∅ 13.5 mm

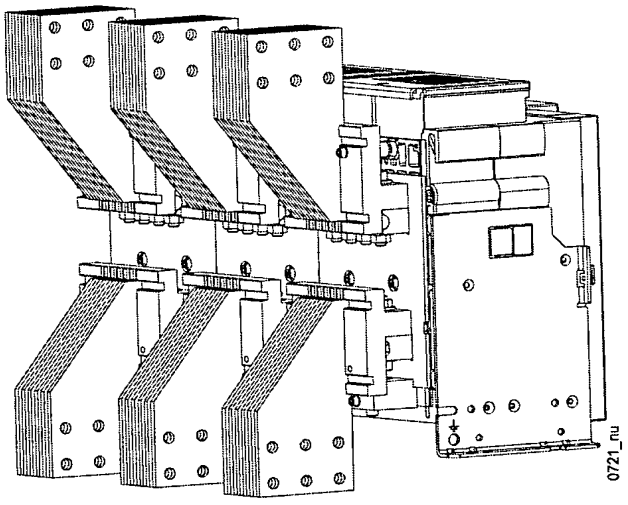


(1) Kurze Innensechskantschraube ISO 4762 M6 mit Spannscheibe
(2) Kurze Distanzhülse
(3) Flachrundschraube DIN 603 M12 mit Spannscheibe und Mutter
(4) Lange Innensechskantschraube ISO 4762 M6 mit Spann-scheibe
(5) Lange Distanzhülse

(1) Short hexagon socket screw ISO 4762 M6 with belleville washer
(2) Short distance sleeve
(3) Coach screw DIN 603 M12 with belleville washer and nut
(4) Long hexagon socket screw ISO 4762 M6 with belleville washer
(5) Long distance sleeve

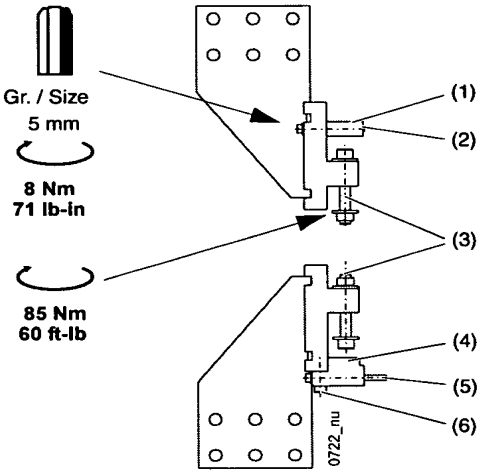
Baugröße III

Frame size III



(1) Bohrungen ∅ 14 mm

(1) Holes ∅ 14 mm



(1) Distanzhülse
(2) Innensechskantschraube ISO 4762 M6x75 mit Spannscheibe
(3) Innensechskantschraube ISO 4762 M12x80 mit Spannscheibe und Mutter
(4) Abstützung
(5) Innensechskantschraube ISO 4762 M6x85 mit Spannscheibe
(6) Taptiteschraube DIN 7500 M8x30

(1) Distance sleeve
(2) Hexagon socket screw ISO 4762 M6x75 with belleville washer
(3) Hexagon socket screw ISO 4762 M12x80 with belleville washer and nut
(4) Support
(5) Hexagon socket screw ISO 4762 M6x85 with belleville washer
(6) Taptite screw DIN 7500 M8x30

5.2.3.3 Bestell-Nummern

5.2.3.3 Catalog numbers

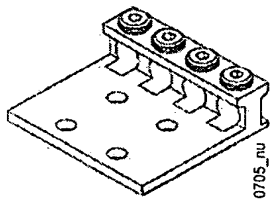
Front connectors Frontanschlüsse	Frame size Baugröße	Max. circuit breaker rated current Max. Bemessungsnennstrom $I_{n\,max}$ (A)	Catalog No. Bestell-Nr.
Set for 3 phases, load and line Satz für 3 Phasen, oben und unten	I	800 /1200	WLH1F12CONUL
Set for 1 phase, load and line Satz für 1 Phase, oben und unten	II	800 / 1200 / 1600	WLL2F16CONUL
		2000	WLL2F20CONUL
		2500 / 3000	WLL2F30CONUL
	III	4000 / 5000	WLL3F50CONUL

5.2.4 Kabelanschlüsse

Die Kabelanschlüsse dienen dem Anschließen von Kabeln direkt an die Frontanschlüsse des Leistungsschalters. Sie sind geeignet für einen maximalen Kurzschlussstrom von 65 kA.

5.2.4 Cable terminals

Pressure wire connectors are used to connect power cables to the front connectors of the circuit breaker. The pressure wire connectors are suitable for max. short circuit current rating of 65 kA.



Die Kabelanschlüsse sind getestet nach UL-486 B mit flexiblem Standardkabel.

Terminals have been tested per UL-486 B with standard stranded cable.

5.2.4.1 Anschließen

5.2.4.1 Cabeling

Frame size Baugröße	Rated current Bemessungsstrom	Cables per connector Anzahl der Kabel pro Anschluss	Connector wire range Kabelstärke	Torque Anzugsmoment
I	800 A / 1200 A	1 - 4	6 - 350 kcmil Cu / Al	325 lb-in 36 Nm
II	1200 A	1 - 4	6 - 350 kcmil Cu / Al	325 lb-in 36 Nm
	1600 A	1 - 6	300 - 600 kcmil Cu / Al	375 lb-in 42 Nm
	2000 A	1 - 6	250 - 600 kcmil Cu	375 lb-in 42 Nm

5.2.4.2 Anbau

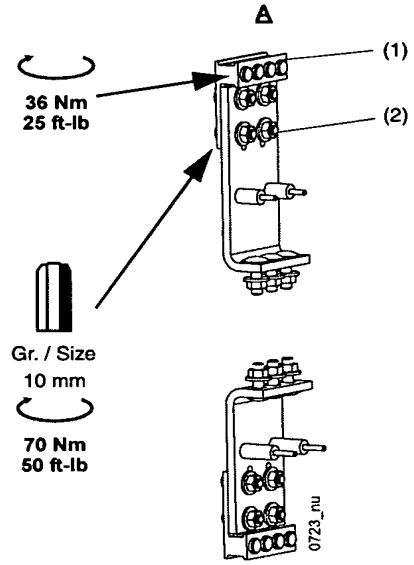
GEFAHR

Gefährliche elektrische Spannung!

Kann Tod, schwere Personenschäden sowie Schäden an Geräten und Ausrüstung bewirken.

Vor dem Arbeiten an diesem Gerät, Anlage unbedingt spannungsfreischalten.

1 Frontanschlüsse anbauen.
2 Kabel an die Kabelanschlussklemmen anschließen und die Klemmenschrauben mit dem unten angegebenen Moment festziehen.
3 Kabelanschlussklemmen mit Schrauben, Spannscheiben und Muttern an die Frontanschlüsse anbauen und mit dem angegebenen Moment festziehen.



A BG I und BG II, 1200 A
B BG II, 1600 A und 2000 A

(1) Kabelanschlussklemmen
(2) 4 Innensechskantschrauben M12x35 mit Spannscheibe und Mutter
(3) 2 Innensechskantschrauben M8x50 mit Spannscheibe und Mutter

5.2.4.2 Attaching

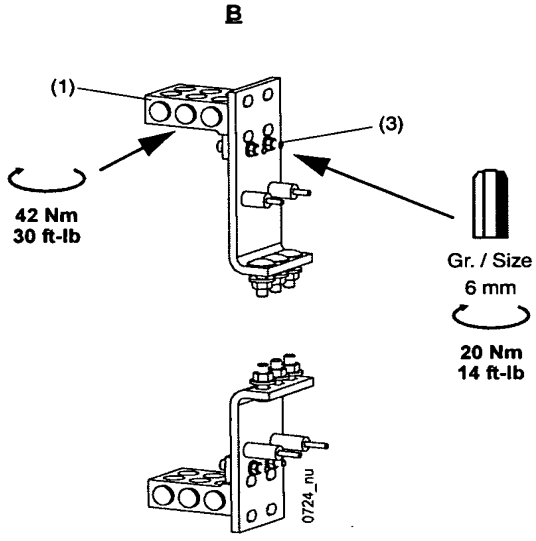
DANGER

Hazardous voltage!

Will cause death, serious personal injury, or equipment / property damage.

Disconnect power before working on this equipment.

1 Attach the front connectors.
2 Attach power cables to wire connectors and tighten cable set screws to a torque given below.
3 Mount pressure wire connectors to the front connectors with mounting bolts, belleville washers and nuts and tighten to a torque given below.



A FS I and FS II, 1200 A
B FS II, 1600 A and 2000 A

(1) Wire main connector
(2) 4 hexagon socket screws M12x35 or $^{1}/_{2}$"x$1^{1}/_{4}$" with belleville washer and nut
(3) 2 hexagon socket screws M8x50 or $^{3}/_{8}$"x2" with belleville washer and nut

5.2.4.3 Bestell-Nummern

5.2.4.3 Catalog numbers

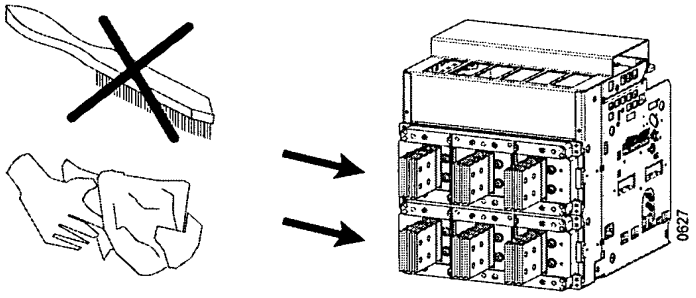
Frame size Baugröße	Max. circuit breaker rated current Max. Bemessungsnennstrom $I_{n\,max}$ (A)	Catalog No. Bestell-Nr.
I / II	800 / 1200 / 1600	WLS2P12CONUL
II	1600 / 2000	WLS2P20CONUL

5.3 Hauptleiter anschließen

5.3 Connecting the main conductors

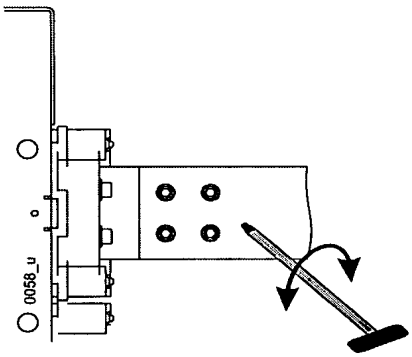
Hauptleiteranschluss säubern (Beschichtete Schienen)

Cleaning the main conductor connection (Plated bus bars)



Anlagenseitige Schienen festschrauben

Securing line and load side busbars



Benutze Schrauben M12-8.8 mit Spannscheiben und einem Anzugsmoment von 70 Nm.

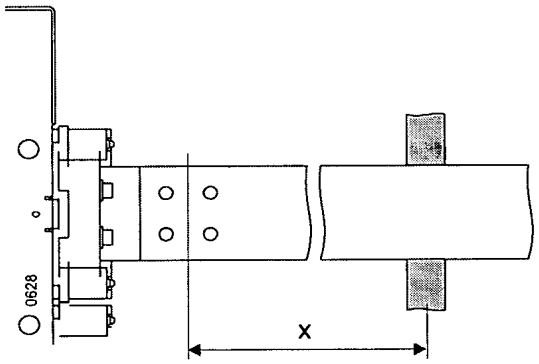
Use grade 5 bolts $^1/_2$" and Belleville washers.
Use tightening torque of 50 ft-lbs.

Hauptleiter abstützen

Die Anschlussschienen aller Pole sind gegeneinander zu fixieren, einspeisende und abgehende Anschlussschienen separat.

Bracing the main conductors

Bracing main conductors of all poles together, line and load separately.



Frame Size Baugröße	Interupting Rating Nenn-Ausschaltstrom (kA)	Distance X / Maß X (mm)	 (inch)
I	65	250	10
	85 / 100	200	8
II	65	250	10
	85	200	8
	100	200	8
III	100	200	8
	150	100	4

Größere Maße möglich, wenn nach der SWBD-Typprüfung nach UL 891 zugelassen.

Longer distances possible, if proven by SWBD type test according UL 891.

VORSICHT	CAUTION
Für Nenn-Ausschaltströme über 100 kA müssen die Anschlussschienen aller Pole gemeinsam abgestützt werden!	For short circuit ratings greater than 100 kA RMS brace the bussing of all poles and additionally line and load bussing together!

5.4 Hilfsleiteranschlüsse

Klemmenbelegung

→ Schaltpläne (Seite 8-1)

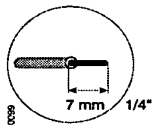
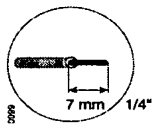
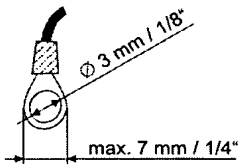
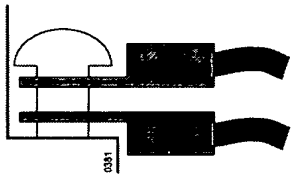
Querschnitte

5.4 Secondary Wiring

Terminal assignment

→ Circuit diagrams (page 8-1)

Cross sections

Connection Type Anschluss-Typ	Strip Conductors Leiter abisolieren	1 x	2 x
Screw-type terminal (SIGUT system) **Schraubklemmen (SIGUT-Technik)**		**20 -14 AWG1)** **0.5 - 2.5 mm² 1)**	**20 -14 AWG 1)** **0.5 - 1.5 mm² 1)**
Screwless terminal system **Schraublose Anschlusstechnik**		**20 -14 AWG 1)** **0.5 - 2.5 mm² 1)**	**20 -14 AWG 2)** **0.5 - 2.5 mm² 2)**
Pre-assembled wires **Vormontierte Leitungen**		**14 AWG** Length / Länge: 40" / 1 m	
Ring terminal system **Ringösen-Schraubtechnik**		**14 - 16 AWG** Recommendation: AMP, PIDG series Catalog No. 50881 Empfehlung: AMP, Reihe PIDG Bestell-Nr. 50881 **10 AWG** Recommendation: Siemens part Catalog No. WL10RL Empfehlung: Siemens part Bestell-Nr. WL10RL 	

1) Aderednhülsen sind zulässig
   1 x bis 2,5 mm² Rohrform **ohne** Kunststoffhülse
   1 x bis 1,5 mm² Rohrform **mit** Kunststoffhülse
   2 x bis 1,5 mm² Rohrform **mit** Kunststoffhülse, Zwillings-Aderendhülse

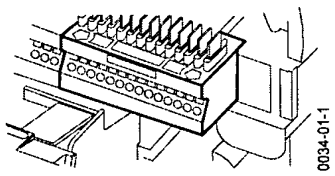
2) 2 x bis 2,5 mm² Rohrform **ohne** Kunststoffhülse
   2 x bis 1,5 mm² Rohrform **mit** Kunststoffhülse

1) Use of wire end ferrules (crimp style) is possible
   1 x up to14 AWG tube-type **without** insulating sleeve
   1 x up to 16 AWG tube-type **with** insulating sleeve
   2 x up to 16 AWG tube-type **with** insulating sleeve, twin wire end ferrule

2) 2 x up to 14 AWG tube-type **without** insulating sleeve
   2 x up to 16 AWG tube-type **with** insulating sleeve

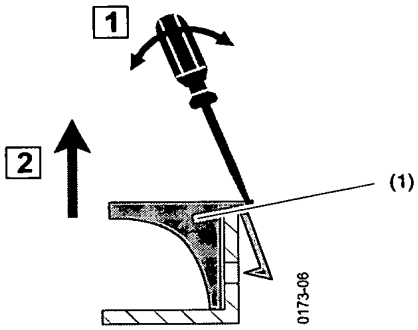
5.4.1 Messerleiste

Anordnung

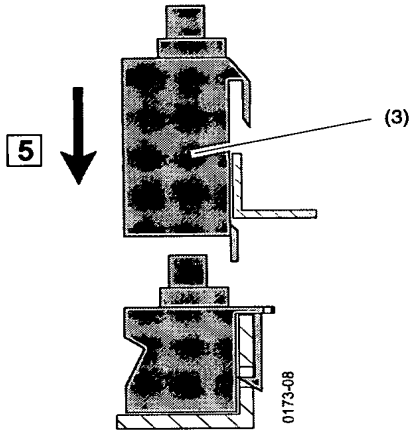


(1) Lichtbogenkammer
(2) Messerleiste

Nachrüsten



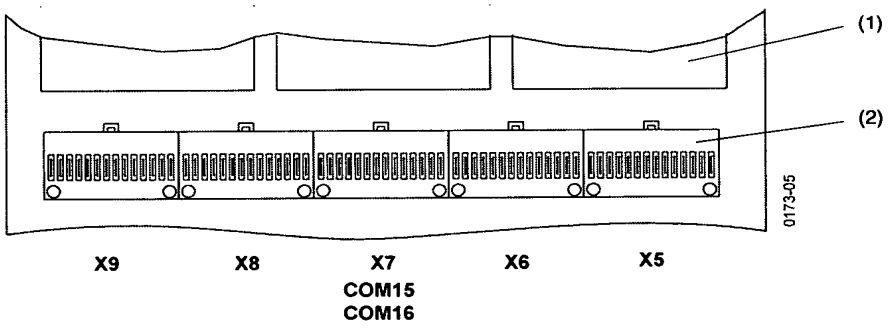
(1) Blindblock
(2) Messerleiste



(3) Messerleistenadapter für Einschubschalter BG II C-Klasse und BG III

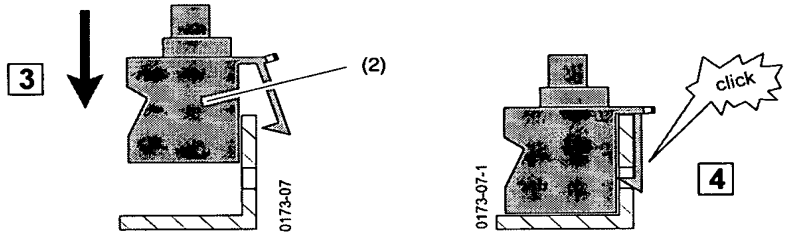
5.4.1 Secondary Disconnect

Arrangement

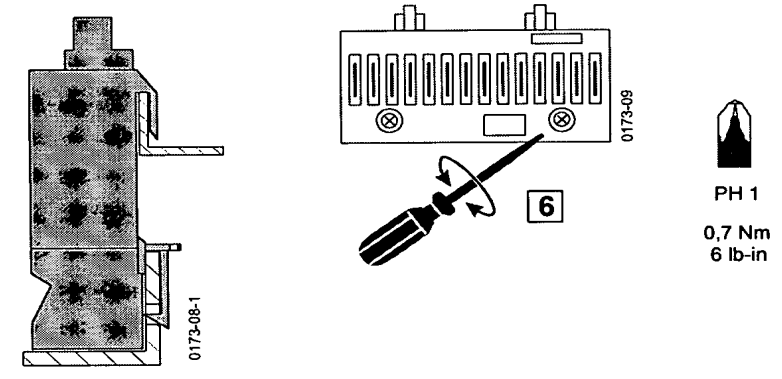


(1) Arc chute
(2) Secondary disconnect block

Field installing



(1) Dummy module
(2) Secondary disconnect block



(3) Secondary disconnect adapter block for draw-out circuit breakers FS II C-class and FS III

Austauschen der Hilfsleiteranschlüsse

Ist der Leistungsschalter mit Messerleisten ausgerüstet, die nicht vollständig mit Kontaktmessern ausgestattet sind, kann es beim Nachrüsten von zusätzlichem Zubehör erforderlich werden, diese Messerleisten gegen vollständig bestückte auszutauschen.

Der Ausbau einer Messerleiste erfolgt in umgekehrter Reihenfolge wie das Nachrüsten.

Exchanging Secondary Disconnects

If the circuit breaker is fitted with secondary disconnect blocks that are not fully equipped with contact blades, it may be necessary to replace these secondary disconnect blocks with fully equipped ones when field installing supplementary accessories.

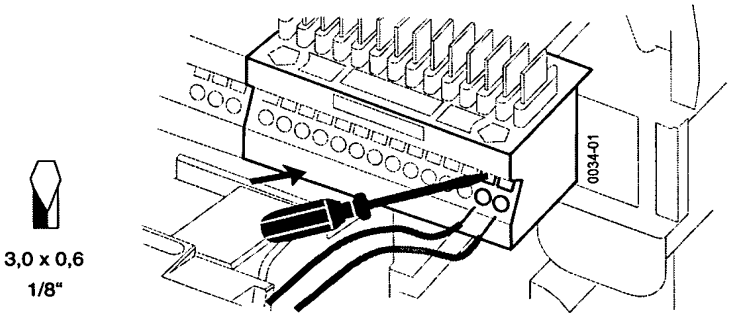
Secondary disconnect blocks are disassembled in the reverse order that they are field installed in.

Leitungen anschließen

Schraublose Anschlusstechnik

Connecting Secondary Wiring

Screwless terminal system

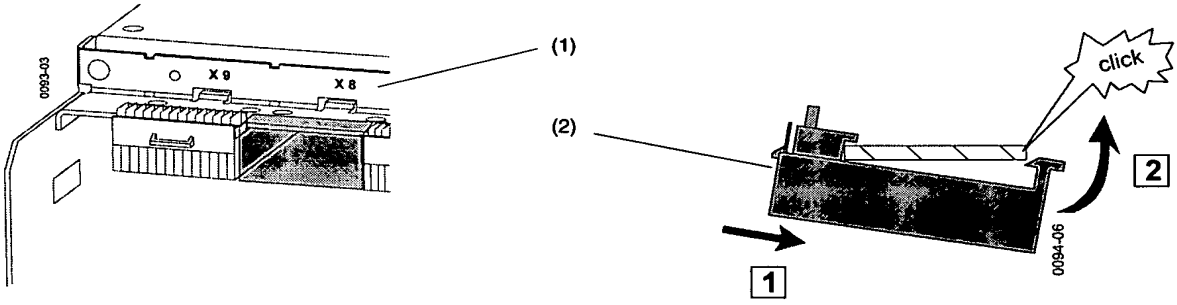


5.4.2 Schleifkontaktmodul

Nachrüsten

5.4.2 Guide Frame Secondary Disconnect Block

Field installing



(1) Einschubrahmen mit Schleifkontaktmodulen
(2) Schleifkontaktmodul

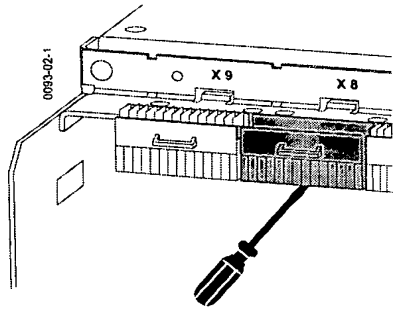
(1) Guide frame with sliding contact modules
(2) Secondary disconnect blocks

Demontage

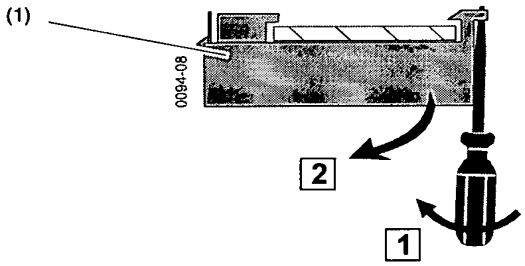
Ist der Leistungsschalter mit Schleifkontaktmodulen ausgerüstet, die nicht mit Kontakten ausgestattet sind, kann es beim Nachrüsten von zusätzlichem Zubehör erforderlich werden, diese gegen Schleifkontaktmodule mit Kontakten auszutauschen.

Disassembly

If the circuit breaker is fitted with secondary disconnect blocks that are not equipped with contacts, it may be necessary to replace them with secondary disconnect blocks with contacts when field installing supplementary accessories.



(1) Schleifkontaktmodul
(ohne Kontakte)



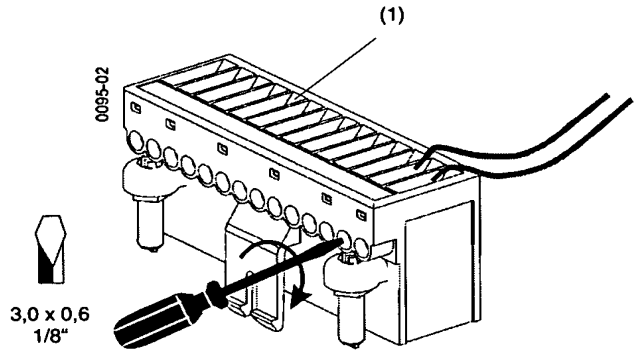
(1) Secondary disconnect block
(without contacts)

5.4.3 Hilfsstromstecker

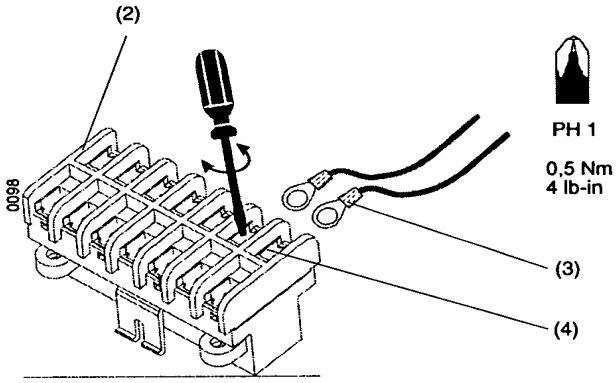
Ausführungen

5.4.3 Secondary disconnect terminal blocks

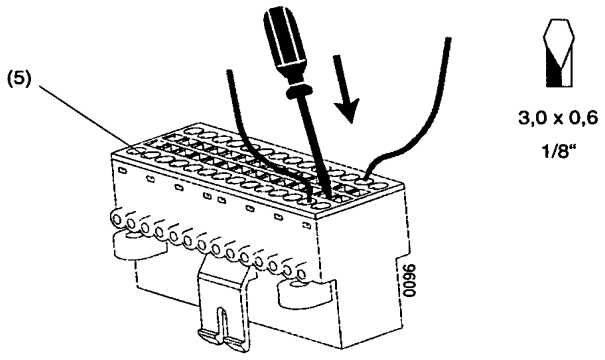
Versions



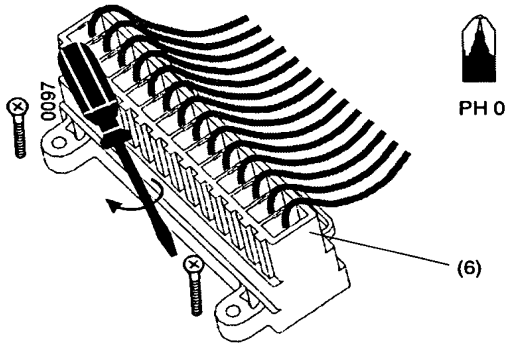
(1) SIGUT-Technik
(2) Ringösen-Schraubtechnik
(3) Isolierte Ringöse
(4) Schrauben ANSI B 18.6.3 #4



(1) SIGUT system
(2) Ring terminal system
(3) Insulated ring terminal
(4) Screws ANSI B 18.6.3 #4



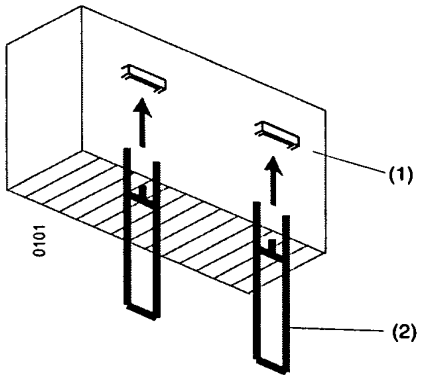
(5) Schraublose Anschlusstechnik
2 Klemmen pro Kontakt
(6) **Nur Festeinbauschalter:** Vormontierte Leitungen



(5) Screwless terminal system
2 terminals per contact
(6) **Fixed-mounted breaker only:** pre-assembled wires

Führungszungen anbringen
(Nur Festeinbauschalter)

Mounting of guide tongues
(Fixed-mounted breaker only)

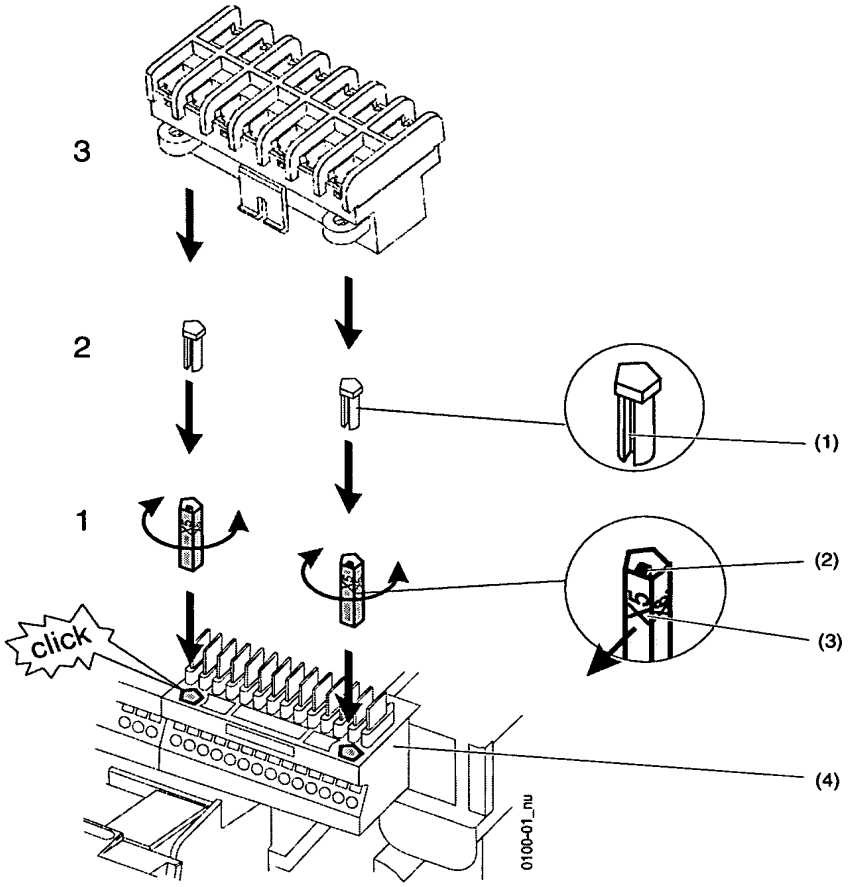


(1) Rückseite Hilfsstromstecker
(2) Führungszungen

(1) Back side of auxiliary connector
(2) Guide tongues

Kodierung Hilfsstromstecker - Messerleiste
(Nur Festeinbauschalter)

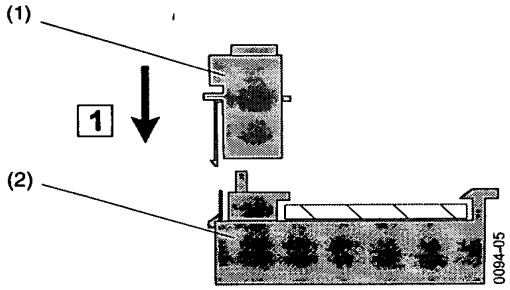
Coding auxiliary connectors
(Fixed-mounted breaker only)



(1) Nut
(2) Führung
(3) Modulbezeichnung (hier: X5; muss nach vorn zeigen)
(4) Modul X5

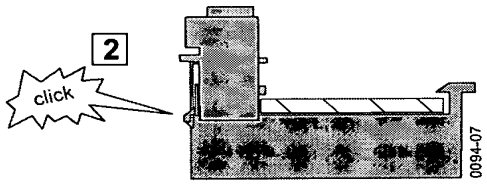
(1) Male pin: groove
(2) Female socket: guide
(3) Number of module (here: X5; hs to be visible from the front)
(4) Module X5

Hilfsstromstecker aufsetzen



(1) Hilfsstromstecker
(2) **Festeinbauschalter:** Messerleiste
Einschubschalter: Schleifkontaktmodul

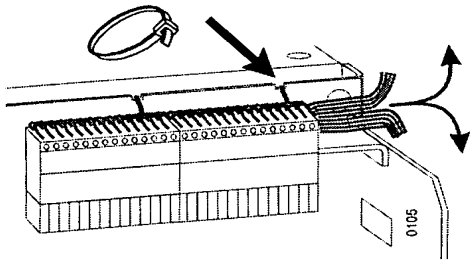
Attaching the secondary disconnect blocks



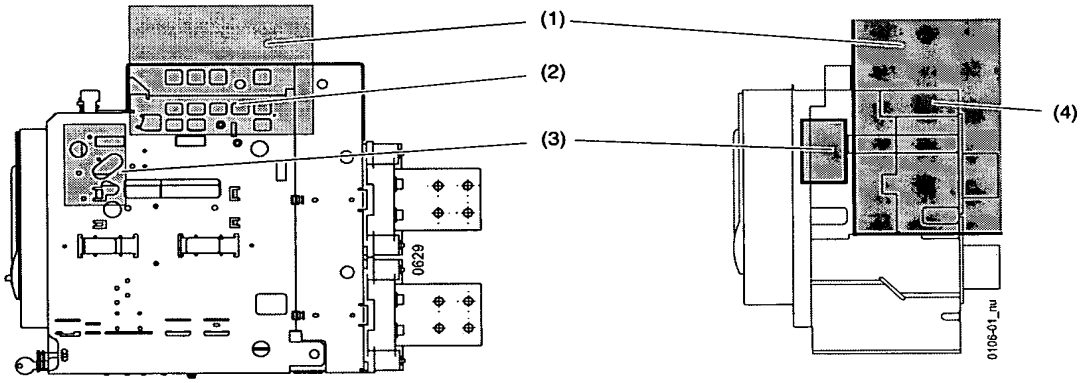
(1) Auxiliary connector
(2) **Fixed-mounted breaker:** Breaker secondary disconnect block
Draw-out breaker: Guide frame secondary disconnect block

5.4.4 Leitungsverlegung am Einschubrahmen

5.4.4 Wiring in guide frame



VORSICHT	CAUTION
Unzulässige Bereiche für Leitungen:	**Impermissible area for wires:**



(1) Ausblasraum*)
(2) Ausblasöffnungen
(3) Verriegelungen
(4) Tragegriff

(1) Arcing space*)
(2) Arcing openings
(3) Interlockings
(4) Carring handle

*) Sind Lichtbogenkammerabdeckungen vorhanden, dürfen die Hilfsleiter nicht auf diesen Abdeckungen verlegt werden.

*) If arc chute covers are available, the auxiliary wires must not be laid on these covers.

5.4.5 Bestell-Nummern

5.4.5 Catalog numbers

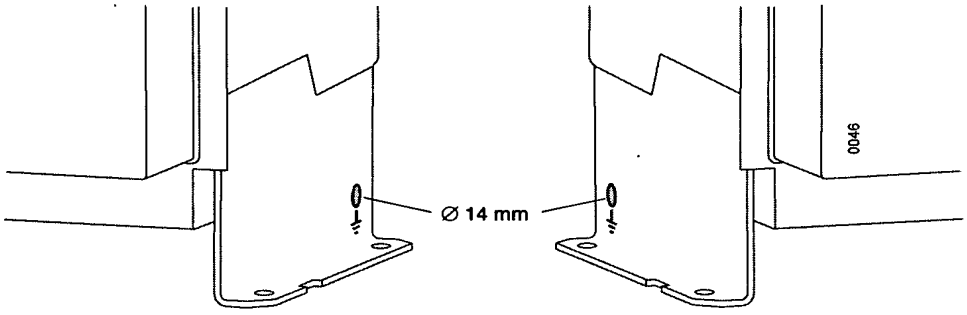
	Catalog No. Bestell-Nr.
Breaker secondary disconnect block Messerleiste	WLCNMD
Secondary disconnect extension (for UL 1066 or UL 489 C-class only circuit breakers) Zusatzmesserleiste (für hohe Lichtbogenkammer)	WLCNMDA
Screw type terminal system SIGUT Hilfsstromstecker SIGUT	WLGAUXPLUGP
Screwless terminal system Hilfsstromstecker schraublose Anschlusstechnik	WLGAUXPLUGT
Ring terminal system Hilfsstromstecker Ringösen	WLGAUXPLUGR
Pre-assembled wires Hilfsstromstecker mit vormontierten Leitungen	WLTERMBLKUL
Coding set Kodiersatz	WLCODEKITUL
Guide frame secondary disconnect block on guide frame Schleifkontaktmodul	WLGDSCN
Blanking cover Blindblock	WLGDAUXPLUG
Ring terminal crimp lug for AWG 10 wire Ringöse für Leitung AWG 10	WL10RL
Dummy- secondary disconnect block on guide frame Dummy-Schleifkontaktmodul	WLGBDSCN

5.5 Schutzleiter anschließen

5.5 Connecting the ground pad

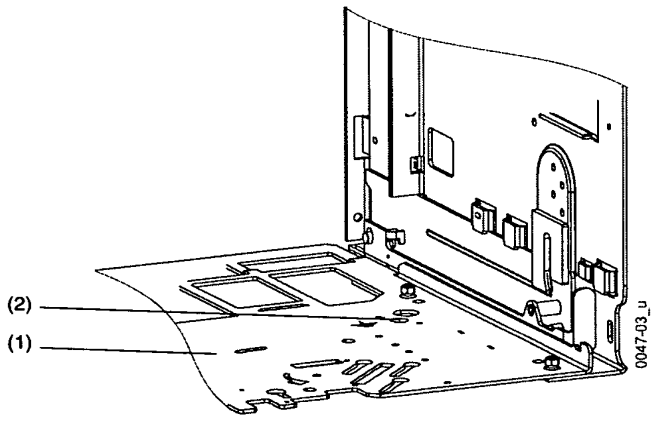
Festeinbauschalter

Fixed-mounted breaker



Einschubrahmen

Guide frame

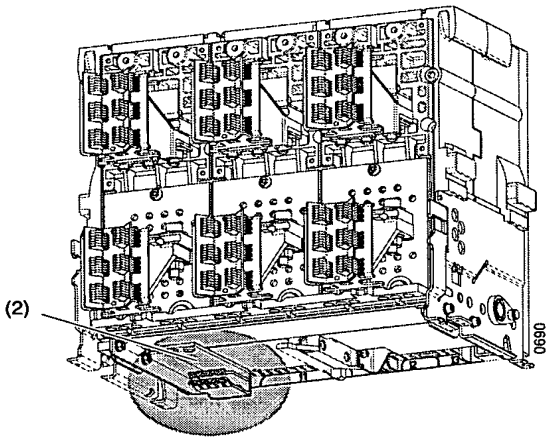


(1) Bodenblech Einschubrahmen
(2) Bohrung für Erdungsanschluss für Schraube M12

(1) Base plate of guide frame
(2) Hole for grounding; use ½" bolt

5.6 Zusätzlicher Erdungskontakt zwischen Einschubrahmen und Einschubschalter (BG II und III)

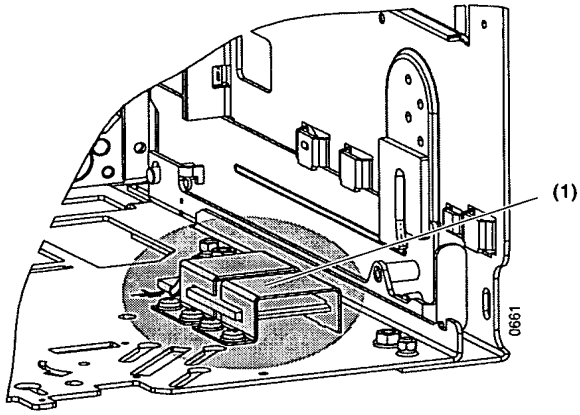
Für eine zuverlässige Erdung des Einschubschalters kann optional eine spezielle Erdungsvorrichtung nachgerüstet werden.



(1) Kontaktmodul am Einschubrahmen
(2) Kontaktmodul für Einschubschalter

5.6 Additional grounding contact between guide frame and draw-out circuit breaker (FS II and III)

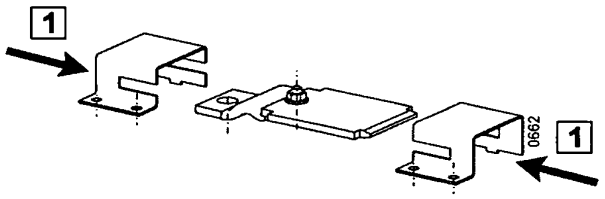
Additional ground pad for attaching external grounding conductor.



(1) Ground pad for the guide frame
(2) Ground pad for the draw-out circuit breaker

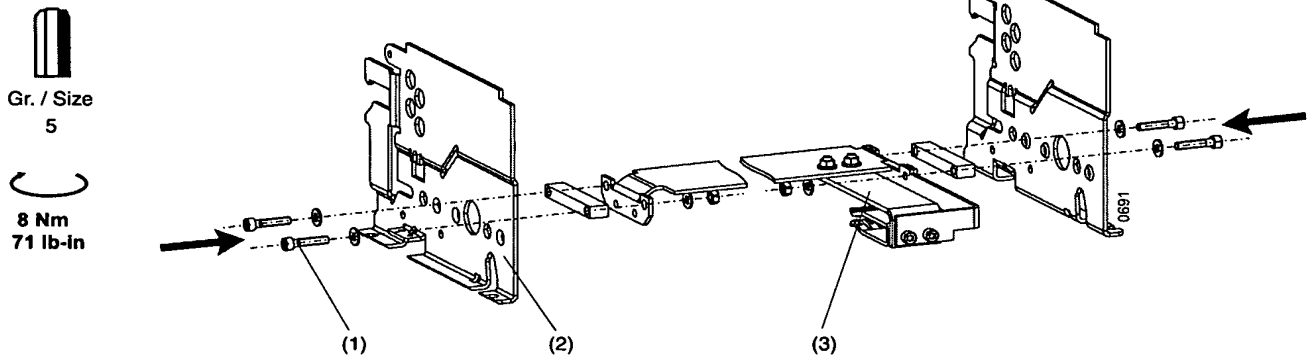
5.6.1 Nachrüsten

Anbau des Kontaktmoduls am Einschubrahmen



(1) Zylinderschraube M6 mit Scheiben und Mutter
(2) Kupferscheibe
(3) Erdungswinkel (Kundenbeistellung)
(4) Bodenblech Einschubrahmen
(5) 4x selbstschneidende Schraube M4 mit Scheibe

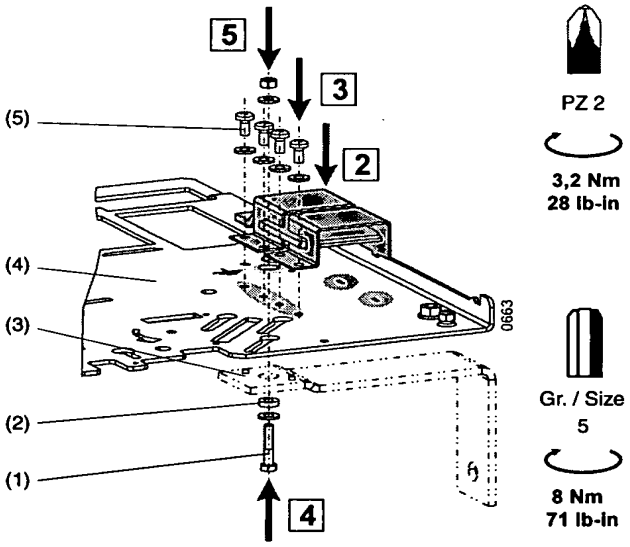
Kontaktmodul am Einschubschalter anbauen



(1) 4x Zylinderkopfschraube M6 mit Scheiben und Mutter
(2) Schalterfuß
(3) Kontaktmodul

5.6.1 Field installing

Installing ground pad on the guide frame



(1) M6 cheese-head screw with nuts and washers (hex key)
(2) Copper plate
(3) Ground strap (to be provided by customer)
(4) Base plate of guide frame
(5) 4x self-tapping M4 screws with washer (pozidrive)

Attaching ground pad on the draw-out circuit breaker

(1) 4x M6 cheese-head screws
(2) Foot of draw-out circuit breaker
(3) Ground pad

5.6.2 Bestell-Nummern

5.6.2 Catalog numbers

	Catalog No. Bestell-Nr.
Additional grounding between the breaker and the guide frame, for FS II Kontaktmodul für Einschubrahmen BG II	WLEF2
Additional grounding between the breaker and the guide frame, for FS III Kontaktmodul für Einschubrahmen BG III	WLEF3

6 Inbetriebnahme

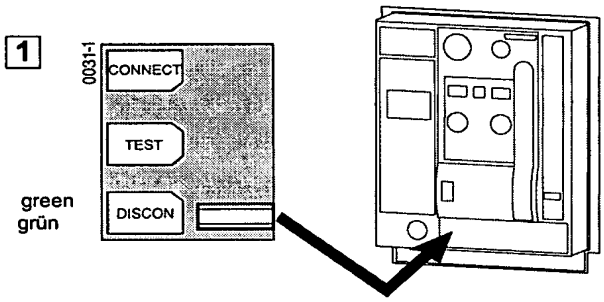
6.1 Vorbereitung des Einschubschalters

Hinweis
Bei Leistungsschaltern der BG I ist die Kurbel an der rechten Seite senkrecht angeordnet. Die Bedienung ist jedoch die gleiche.

6.1.1 Schalter in Einschubrahmen einsetzen

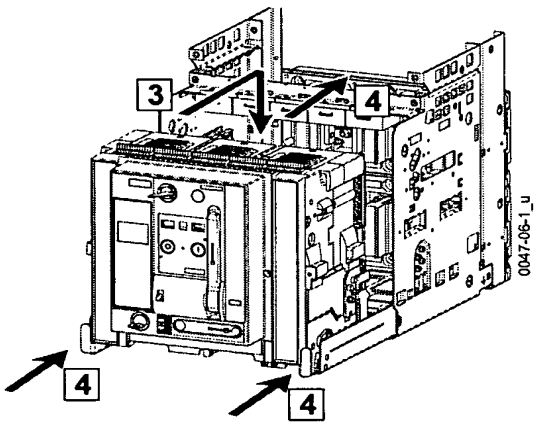
VORSICHT
Bügelschlösser am Shutter entfernen!

Positionsanzeige prüfen / Verfahrschienen herausziehen



Bei anderer Anzeige ist Einschieben des Schalters nicht möglich.

Schalter einsetzen und in Trennstellung schieben / Schaltschranktür schließen



6 Getting started

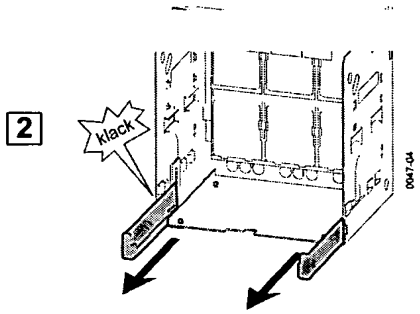
6.1 Preparation of draw-out circuit breaker

Note
At circuit breaker FS I the racking handle is located at the right side upright. The handling is equal.

6.1.1 Inserting the circuit breaker in the guide frame

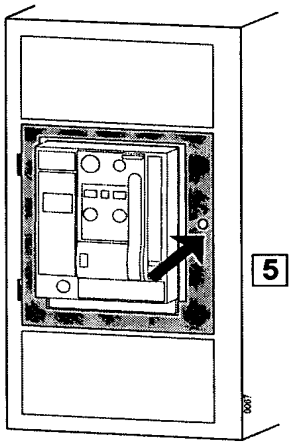
CAUTION
Remove padlocks on the shutter!

Check circuit breaker position indicator/ Draw out guide rails



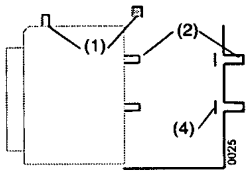
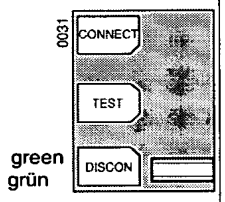
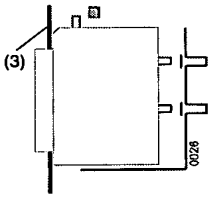
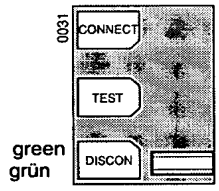
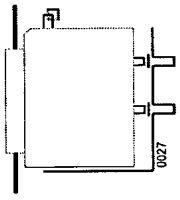
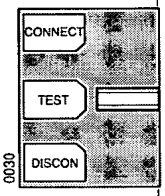
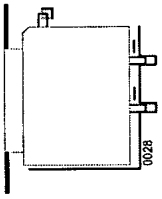
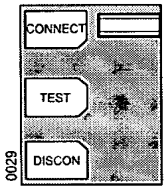
Ensure "DISCON" is displayed on indicator (lower middle of the breaker escutcheon plate).

Place the circuit breaker in the guide frame and push it into the disconnected position. Close cubicle door.



6.1.2 Positionen des Schalters im Einschubrahmen

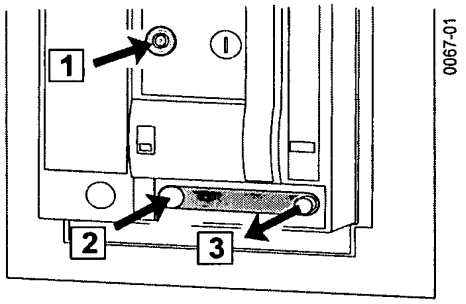
6.1.2 Positions of the circuit breaker in the guide frame

	Diagram Darstellung	Positon Indicator Positionsanzeige	Cicuit Hauptstrom-kreis	Secondary Circuit Hilfstromkreis	Cubicle Door Schalt-schranktür	Shutter Shutter
Maintenance position **Wartungsstellung**		 green grün	disconnected getrennt	disconnected getrennt	open offen	closed geschlossen
Disconnected position **Trennstellung**		 green grün	disconnected getrennt	disconnected getrennt	closed geschlossen	closed geschlossen
Test position **Prüfstellung**		blue blau 	disconnected getrennt	connected verbunden	closed geschlossen	closed geschlossen
Connected position **Betriebsstellung**		red rot 	connected verbunden	connected verbunden	closed geschlossen	open offen

(1) Hilfsstromkreis
(2) Hauptstromkreis
(3) Schaltschranktür
(4) Shutter

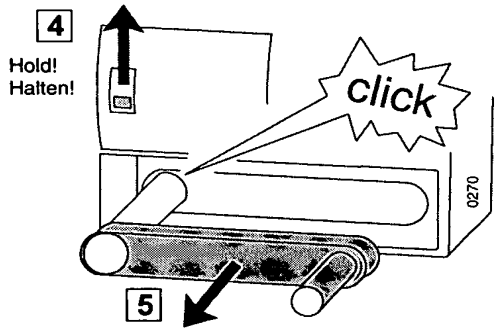
(1) Secondary circuit
(2) Circuit
(3) Cubicle door
(4) Shutter

6.1.3 Handkurbelsperre lösen / Handkurbel herausziehen



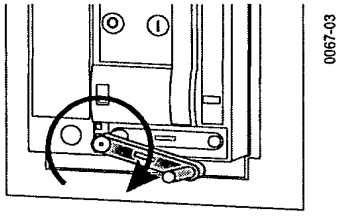
1 Ausschalten
2 Kurbel reindrücken
3 Herausziehen des Handgriffs
4 Hebel hochdrücken und halten
5 Kubel herausziehen

6.1.3 Un latch racking handle / Withdrawing racking handle

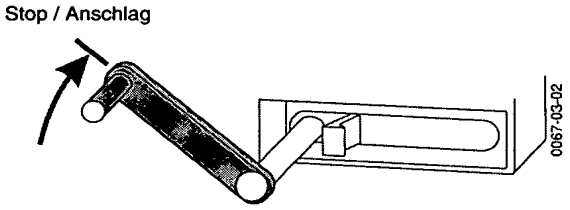


1 OPEN circuit breaker
2 Push crank
3 Extract handle
4 Lift control lever and hold
5 Extract crank

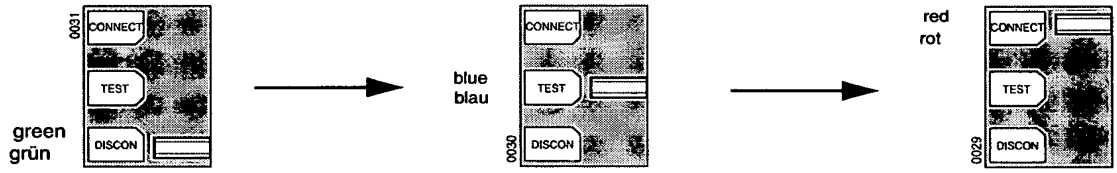
6.1.4 Schalter in Betriebsstellung verfahren



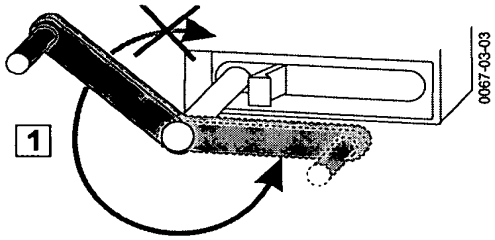
6.1.4 Racking circuit breaker into connected position



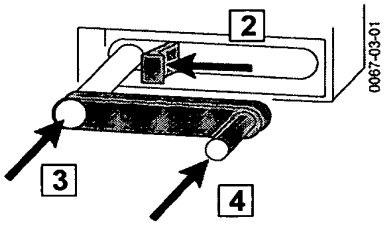
Position indicator
Positionsanzeige



6.1.5 Handkurbel einschieben



6.1.5 Inserting racking handle

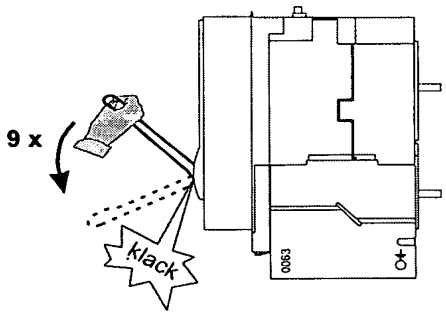


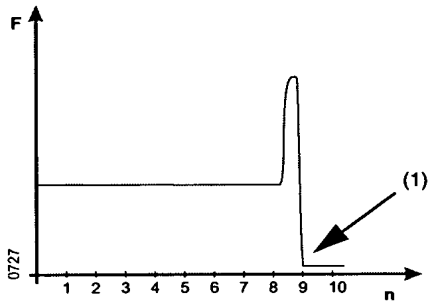
VORSICHT	CAUTION
Handkurbel nicht über den Anschlag hinaus drehen! Anderenfalls wird der Einfahrantrieb beschädigt.	Do not turn the crank handle beyond the stop! Otherwise the racking mechanism will be damaged.

6.2 Federspeicher spannen

Spannen per Hand

⚠ WARNUNG		⚠ WARNING
Kann Personenschäden verursachen. Einen ausgebauten, freistehenden Leistungsschalter vor dem Spannen des Federspeichers unbedingt in geeigneter Weise abstützen (z. B. bei Wartungsarbeiten auf der Werkbank).		**May result in serious injury.** Secure a not mounted circuit breaker when charging it manually (e. g. during service on the work bench).





F Betätigungskraft
n Anzahl der Hübe
(1) Feder ist gespannt

F Handle force
n Number of strokes
(1) Spring charged

ACHTUNG	NOTICE
Zum Spannen des Federspeichers den Handhebel vollständig umfassen und jeden Hub gleichmäßig und vollständig bis zum Anschlag ausführen. Der 9. Hub ist genauso weit zu betätigen, wie die ersten acht Hübe, obwohl die Betätigungskraft deutlich zunimmt. Ist der Federspeicher vollständig gespannt, lässt sich der Handhebel ohne Widerstand bewegen.	For charging the spring mechanism completely grab the handle and steadlily execute each stroke as far as it will go. Execute the 9th stroke as far as the first eight strokes, although the handle force will increase significantly. When fully charged, further strokes would feel like idle operations.

Spannen durch Motorantrieb

Motorantrieb startet automatisch nach Anlegen der Steuerspannung. Am Ende des Spannvorgangs schaltet der Motor automatisch ab.

Unmittelbar nach dem Entspannen des Federspeichers wird der Motor erneut eingeschaltet und damit die Feder wieder gespannt (nach einem Einschaltvorgang).

→ Nachrüsten des Motorantriebs (Seite 13-1)

Charging by motor-operated mechanism

The motor-operated mechanism starts automatically after applying control voltage. The motor is automatically switched-off at the end of the charging operation.

The motor will re-engage immediately following spring discharge (closing operation).

→ Installing the motor-operated mechanism (page 13-1)

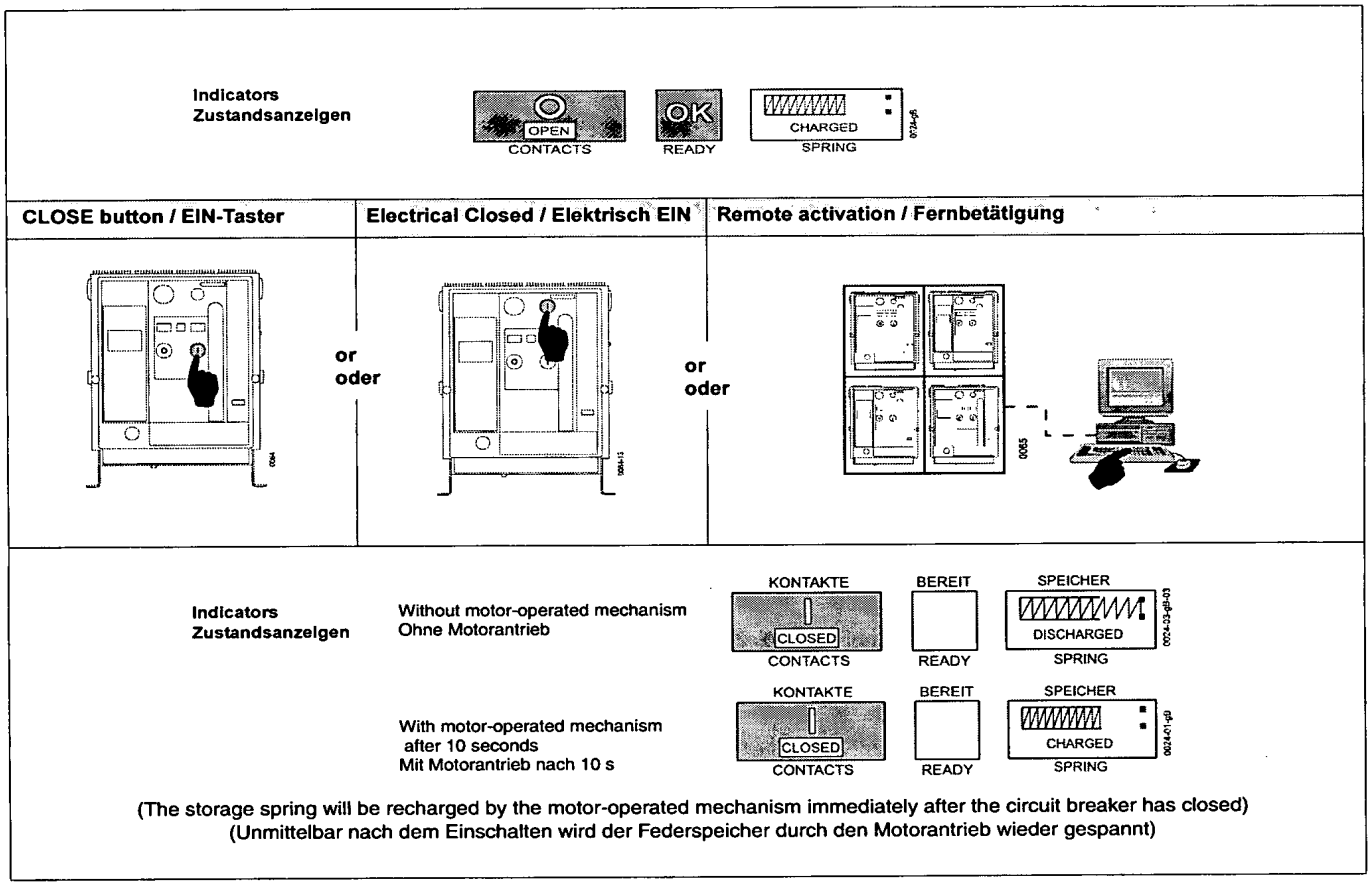
6.3 Checkliste für Inbetriebnahme

6.3 Check list for commissioning

Durchzuführende Arbeiten		**Action required**		✓
Schalter ausschalten		OPEN the circuit breaker		
Bemessungsstrommodul stecken → Bemessungsstrommodul (Seite 9-67)		Insert rating plug → Rating plug (page 9-67)		
Rücksetzknopf drücken Mechanische Wiedereinschaltsperre zurückgesetzt		Press red button to reset bell alarm		
Betriebswerte am Überstromauslöser einstellen → Überstromauslöser (Seite 9-1)		Set the trip unit to appropriate values → Trip units (page 9-1)		
Hilfs- und Steuerspannungen anschließen		Apply secondary and control voltages		
Schaltschranktür schließen		Close the cubicle door		
Einschubschalter in Betriebsstellung verfahren		Rack circuit breaker into connected position		
Handkurbel einschieben		Insert racking handle		
Federspeicher spannen		Charge storage spring		
Bedingungen (je nach Ausführung)		**Ensure the following conditions exist**		
Unterspannungsauslöser	erregt	Undervoltage release	energized	
Spannungsauslöser	nicht erregt	Shunt trip(s)	not energized	
Elektrische Einschaltsperre → (Seite 8-4)	nicht erregt	Electrical closing lockout → (page 8-4)	not energized	
Elektrische Verriegelung des Einschaltmagneten in der Anlagensteuerung	aufgehoben	Electrical interlocking of closing coil in the switch board control wiring	disabled	
Gegenseitige mechanische Schalterverriegelungen	nicht wirksam	Mutual mechanical interlock	not activated	
Sperrvorrichtungen	nicht aktiviert	Locking devices	not activated	
Zustandsanzeigen		**Indicators**		
				

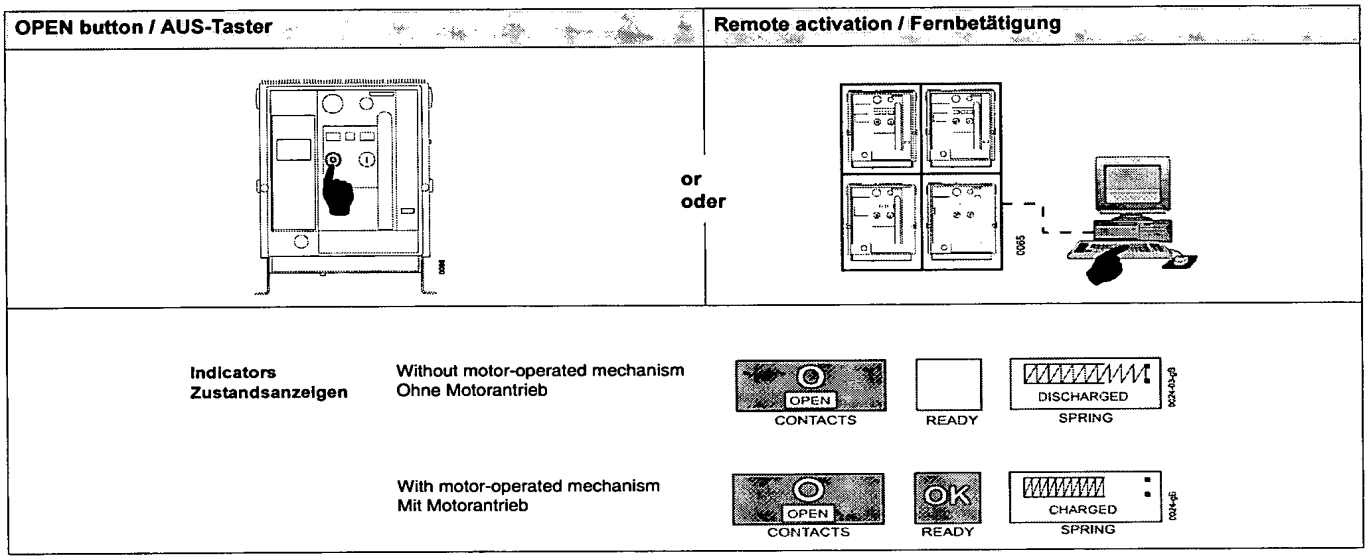
6.4 Einschalten

6.4 Closing



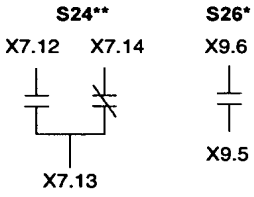
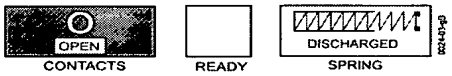
6.5 Ausschalten

6.5 Opening the circuit breaker



6.6 Auslösen

6.6 Tripping

Tripped by Ausgelöst durch	Trip unit Überstromauslöser
"Tripped" indicator Ausgelöst-Anzeige	
"Trip" signaling switch Ausgelöst-Meldeschalter	
Switch indicator Schalterzustandsanzeige	**Indicators** **Zustandsanzeigen** Without motor-operated mechanism Ohne Motorantrieb  With motor-operated mechanism Mit Motorantrieb 

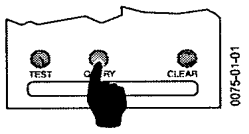
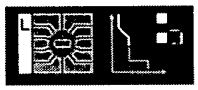
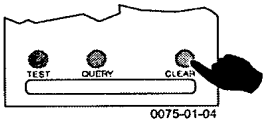
* Reset / Nicht-ausgelöst-Position dargestellt
** Ausgelöst-Position dargestellt

* Reset / No-trip-position shown
** Trip-position shown

6.7 Wiederinbetriebnahme nach Auslösung durch Überstromauslöser

6.7 Re-closing a circuit breaker tripped by the trip unit

Hinweis	NOTICE
Der Auslösegrund kann mit der Taste „QUERY" am Überstromauslöser abgefragt werden. Er wird für mindestens zwei Tage gespeichert, sofern der Überstromauslöser vor der Auslösung mindestens 10 min lang aktiviert war.	The tripping reason can be inquired through the "QUERY" button. It is stored internally for at least two days, if the trip unit had been activated for at least 10 min before tripping.

1 **Find trip cause** **Aulösegrund ermitteln**					
2 **Indicator** **Anzeige**	 Overload in main conductor Überlast im Hauptleiter	 Overload in neutral conductor Überstrom im N-Leiter	 Short circuit: short-time-delay trip Kurzschluss: kurzzeitverzögerte Auslösung	 Short circuit: instantaneous trip Kurzschluss: unverzögerte Auslösung	 Ground fault trip Erdschluss-Auslösung
3 **Find and remedy cause** **Ursache ermitteln und beseitigen**	- Check downstream load - Check trip unit settings - Verbraucher prüfen - Einstellungen am Überstromauslöser überprüfen		-- Inspect switchgear - Check downstream load Schaltanlage überprüfen - Verbraucher prüfen		
4 **Inspect circuit breaker** **Schalter prüfen**			Inspect contact system for possible damage → Maintenance (page 24-1) Kontaktsystem auf eventuelle Schäden untersuchen → Wartung (Seite 24-1)		
5 **Clear trip cause** **Auslösegrund löschen**					

<table>
<tr><td>6
Reset bell alarm

Wiedereinschaltsperre zurücksetzen</td><td>With mechanical bell alarm reset

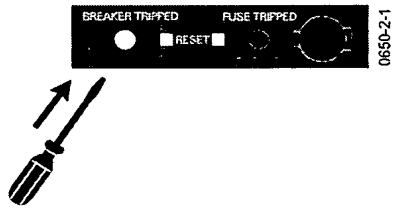
Mit mechanischer Wiedereinschaltsperre

 
</td><td>Automatic reset of bell alarm→ (page 10-2)

Automatische Rücksetzung der Wiedereinschaltsperre → (Seite 10-2)</td></tr>
<tr><td>7
Reset tripped indicator

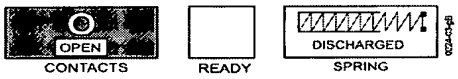
Ausgelöst-Meldung zurücksetzen</td><td> 

Manual reset of bell alarm
and tripped indicator → (page 10-1)

Manuelle Rücksetzung der Wiedereinschaltsperre
und der Ausgelöst-Meldung → (Seite 10-1)</td><td> 
</td></tr>
<tr><td rowspan="2">8
Indicators

Zustands-anzeigen</td><td>Without motor-operated mechanism

Ohne Motorantrieb

 
</td><td></td></tr>
<tr><td>With motor-operated mechanism

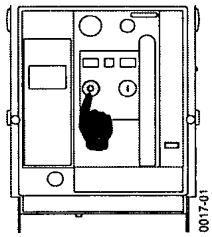
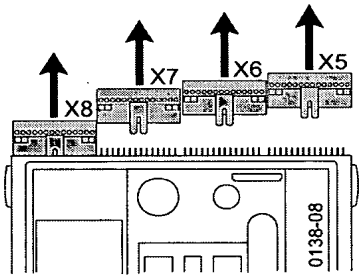
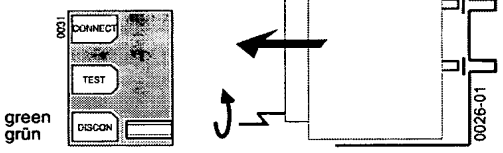
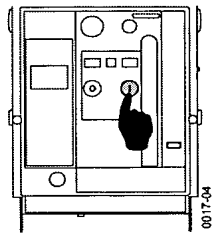
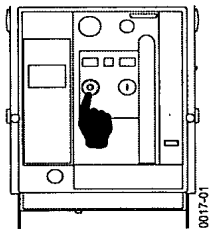
Mit Motorantrieb

 
</td><td></td></tr>
<tr><td>9</td><td colspan="2">Charge the storage spring (page 6-4)

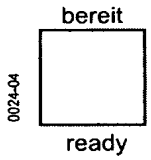
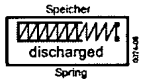
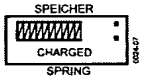
Federspeicher spannen (Seite 6-4)

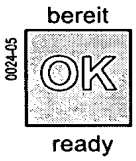
Close the circuit breaker (page 6-6)

Einschalten (Seite 6-6)</td></tr>
</table>

	Fixed-mounted circuit breaker Festeinbauschalter	Draw-out circuit breaker Einschubschalter
1 **OPEN the circuit breaker** **AUS/**		
2 **Disconnect secondary circuits** **Hilfstromkreise trennen**		**Secondary Circuit** **Hilfsstromkreis** **Position Indicator** **Positionsanzeige** 
3 **Depress the CLOSE button.** **EIN/**		
4 **Depress the OPEN button.** **AUS/**		
5 **Indicators** **Zustandsanzeigen**		

6.9 Störungsbeseitigung

Festeinbau-schalter	Einschub-schalter	Störung	Ursache	Abhilfe
X	X	Schalter läßt sich nicht einschalten Schalter ist **nicht** einschaltbereit Einschaltbereitschaftsanzeige: 	1. Federspeicher nicht gespannt 	Federspeicher spannen 
X	X		2. Unterspannungsauslöser nicht erregt	Unterspannungsauslöser an Spannung legen
X	X		3. Mechanische Wiedereinschaltsperre wirksam	Bei Schaltern mit Sicherung: Defekte Sicherungen wechseln und Rücksetzknopf drücken
X	X		4. Elektrische Einschaltsperre wirksam	Steuerspannung der Einschaltsperre aufheben [1]
X	X		5. „Sicheres AUS" mit Zylinderschloss abgeschlossen (Zubehör)	Zylinderschloss aufschließen [1]
X	X		6. „Sicheres AUS" mit Vorhängeschlössern abgeschlossen (Zubehör)	Vorhängeschlösser entfernen [1]
X	X		7. Taster „Mechanisch AUS" abgeschlossen (Zubehör)	Taster „Mechanisch AUS" freigeben [1]
X	X		8. „Not-AUS-Taster" in AUS-Position verriegelt (Zubehör)	„Not-AUS-Taster" entriegeln [1] Entgegen Uhrzeigersinn drehen
X	X		9. Sperre gegen Einschalten bei geöffneter Schaltschranktür wirksam (Zubehör)	Schaltschranktür schließen
X	X		10. Gegenseitige mechanische Verriegelung wirksam (Zubehör)	Verriegelnden Schalter ausschalten bzw. in Trennstellung kurbeln [1]
X	X		11. Elektronischer Überstromauslöser fehlt oder falsch eingebaut	Elektronischen Überstromauslöser richtig einbauen
	X		12. Handkurbel ist herausgezogen	Schalter in Trenn-, Prüf- oder Betriebsstellung kurbeln, Handkurbel entriegeln und bündig einstekken

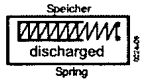
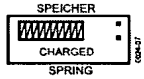
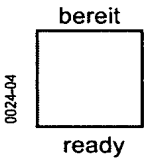
X	X	Schalter läßt sich nicht einschalten Schalter ist einschaltbereit Einschaltbereitschaftsanzeige: 	1. Betriebsspannung des Einschaltmagneten falsch bzw. nicht vorhanden	Kontrollieren bzw. richtige Spannung anlegen
	X		2. Schalter steht in Trennstellung im Einschubrahmen	Schalter in Prüfstellung bzw. Betriebsstellung kurbeln
X			3. Hilfsstromstecker abgezogen	Hilfsstromstecker aufstecken

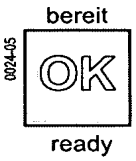
[1] Sicherheitseinrichtung!
Aufhebung der Sicherheitsmaßnahme nur nach Überprüfen der betriebsmäßigen Zulässigkeit!

Festeinbau-schalter	Einschub-schalter	Störung	Ursache	Abhilfe
	X	Schalter kann aus der Wartungsstellung nicht in die Trennstellung geschoben werden	1. Der Einfahrmechanismus steht nicht in Trennstellung	Einfahrmechanismus in Trennstellung kurbeln (grüne Positionsanzeige)
	X	Schalter kann nicht in die Einfahrschienen eingesetzt werden	1. Werkseitige Kodierung von Schalter und Einschubrahmen stimmen nicht überein	Schaltertyp entsprechend Angaben am Einschubrahmen verwenden
	X	Beim Kurbeln von der Trenn- in die Prüfstellung bewegt sich der Schalter während der ersten ca. 6 Umdrehungen nicht	1. Kein Fehler, funktionsbedingt	Weiterkurbeln
	X	Zum Verfahren läßt sich die Handkurbel nicht herausziehen	1. Schalter ist eingeschaltet	Taster „Mechanisch AUS" drücken und Handkurbelsperre anheben [2]
	X		2. Schaltschranktür nicht vollständig geschlossen (Verfahrsperre als Zubehör)	Schaltschranktür schließen
	X	Handkurbel läßt sich nicht zurückstecken	1. Handkurbel ist verriegelt	Schalter in Trenn-, Prüf- oder Betriebsstellung kurbeln, Handkurbel entriegeln und bündig einstekken
X		Schaltschranktür läßt sich nicht öffnen (Türverriegelung als Zubehör)	1. Eingeschalteter Schalter verriegelt die Schaltschranktür	Schalter ausschalten [2]
	X		2. Schalter steht in Betriebsstellung	Schalter in Prüf- oder Trennstellung kurbeln [2]

[2] Nur zulässig, wenn der Hauptstromkreis unterbrochen werden darf!

6.9 Troubleshooting

Fixed-mounted breaker	Draw-out breaker	Disturbance	Possible Cause(s)	Remedy
X	X	Circuit breaker cannot be closed. Circuit breaker **not** ready to close.	1. Spring not charged 	Charge spring 
X	X	Ready-to-close indicator shows: 	2. Undervoltage release not energized.	Energize undervoltage release
X	X		3. Mechanical open fuse lock-out effective	For fused circuit breakers: Replace defective fuses and press reset button
X	X		4. Electrical closing interlock effective	Shut off control voltage for interlocking [1]
X	X		5. "Safety OPEN" locked with cylinder lock (accessories)	Unlock[1]
X	X		6. "Safety OPEN" locked with padlocks (accessories)	Remove padlocks [1]
X	X		7. "OPEN" button locked off (accessories)	Unlock the "OPEN" button [1]
X	X		8. "EMERGENCY OPEN" button engaged in operating position (accessories)	Release "EMERGENCY OPEN" button [1] by rotating it
X	X		9. Lockout effective against closing when cubicle door is open (accessories)	Close cubicle door
X	X		10. Mutual mechanical circuit breaker interlocks effective (accessories)	Open second circuit breaker or rack into disconnected position [1]
X	X		11. Electronic trip unit missing or incorrectly installed	Install electronic trip unit properly
	X		12. Racking handle withdrawn	Rack circuit breaker into disconnected, test or connect position, unlatch crank and push crank fully in

X	X	Circuit breaker cannot be closed. Circuit breaker ready to close.	1. Closing coil not energized or incorrectly energized	Check or apply correct voltage
	X	Ready-to-close indicator: 	2. Circuit breaker in disconnected position in guide frame	Rack circuit breaker into test or connected position
X			3. The secondary disconnects have been removed	Plug in the secondary disconnects

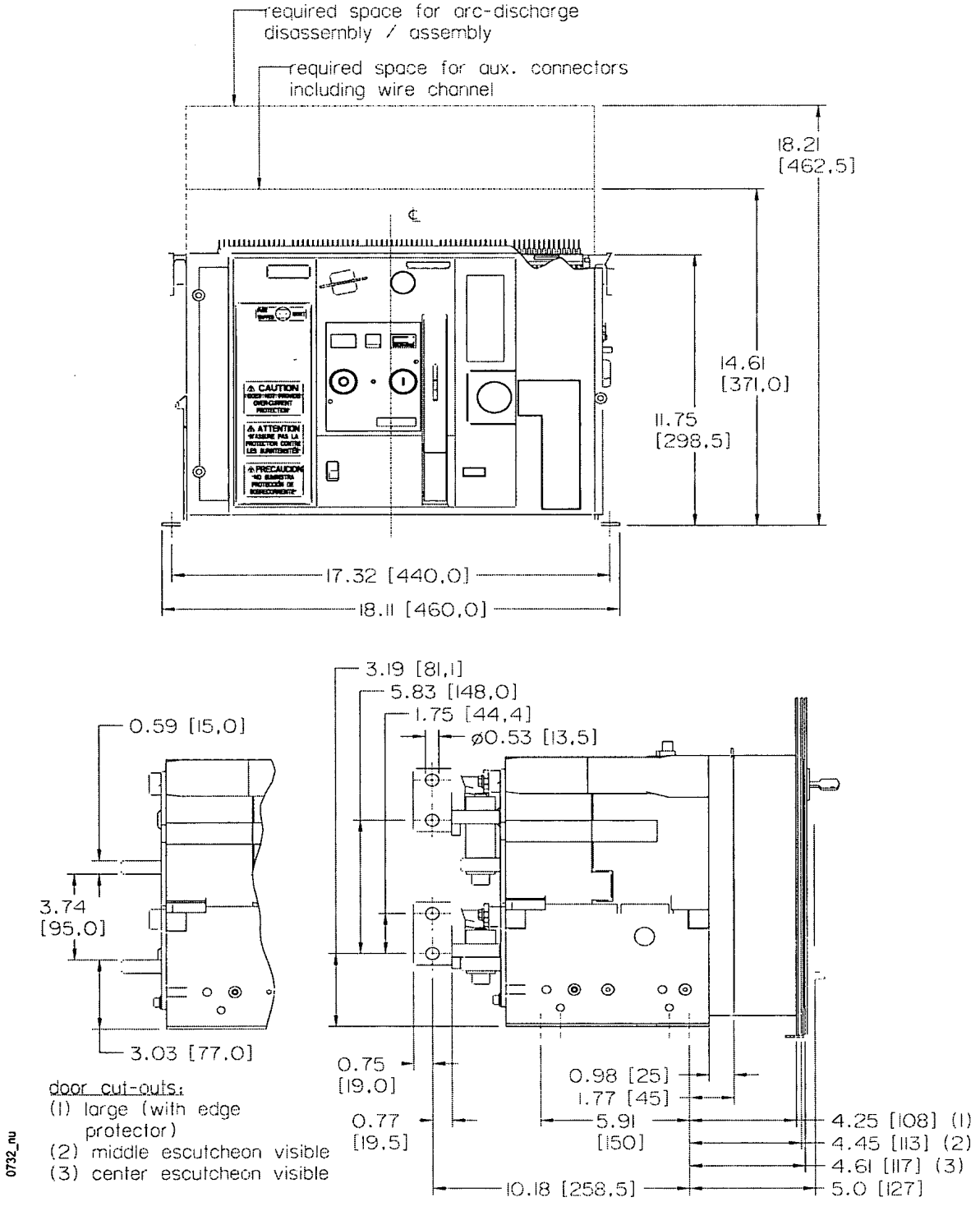
[1] Safety feature!
This remedy action amounts to a reversal (disabling) of a safety precaution installed earlier. Please ensure that such disabling is now permissible / authorized!

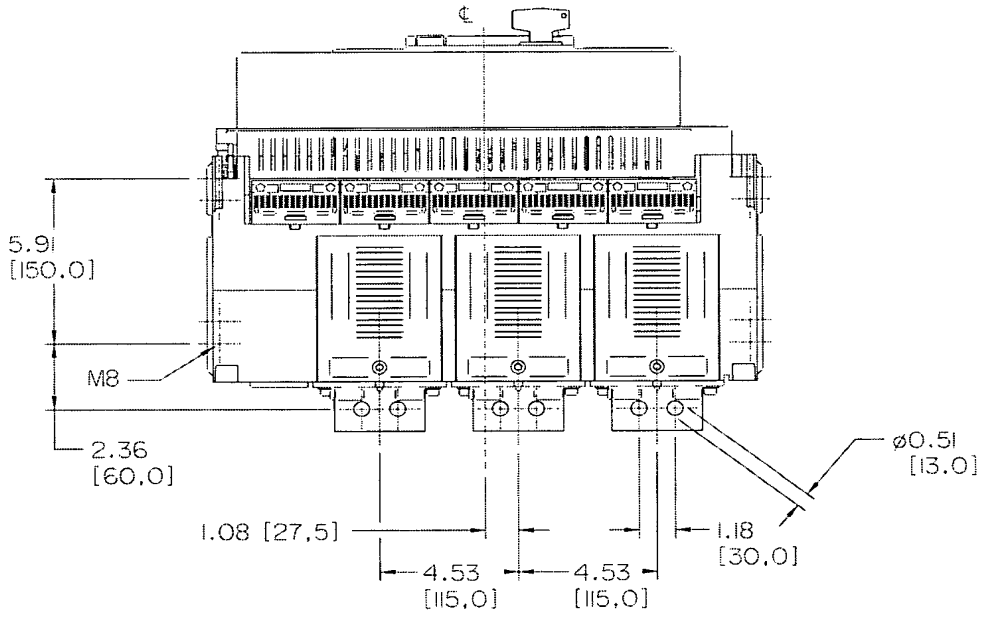
Fixed-mounted breaker	Draw-out breaker	Disturbance	Possible Cause(s)	Remedy
	X	Circuit breaker cannot be moved from the maintenance position into the disconnected position	1. Racking mechanism of circuit breaker not in disconnected (DISCON) position (Check circuit breaker position indicator)	Rack the mechanism into disconnected position (green position indicator)
	X	Circuit breaker cannot be fitted in the guide rails	1. Factory mounted coding of circuit breaker and guide frame doesn't match	Use circuit breaker type according to guide frame label
	X	When racking from the disconnected into the test position, the circuit breaker does not move during the first 6 turns (approximately)	1. Not a fault (functional property)	Rack further
	X	Racking handle cannot be drawn out	1. Circuit breaker is closed	Press "OPEN" button and pull racking handle block out [2]
	X		2. Cubicle door not completely closed (Locking device as accessory)	Close cubicle door
	X	Racking handle cannot be pushed in	1. Racking handle is interlocked	Rack circuit breaker into disconnected, test or connect position, unlatch crank and push crank fully in
X		Cubicle door cannot be opened (door interlock as accessory)	1. Closed circuit breaker is preventing opening of cubicle door	Open the circuit breaker [2]
	X		2. Circuit breaker in connected position	Rack circuit breaker into test or disconnected position [2]

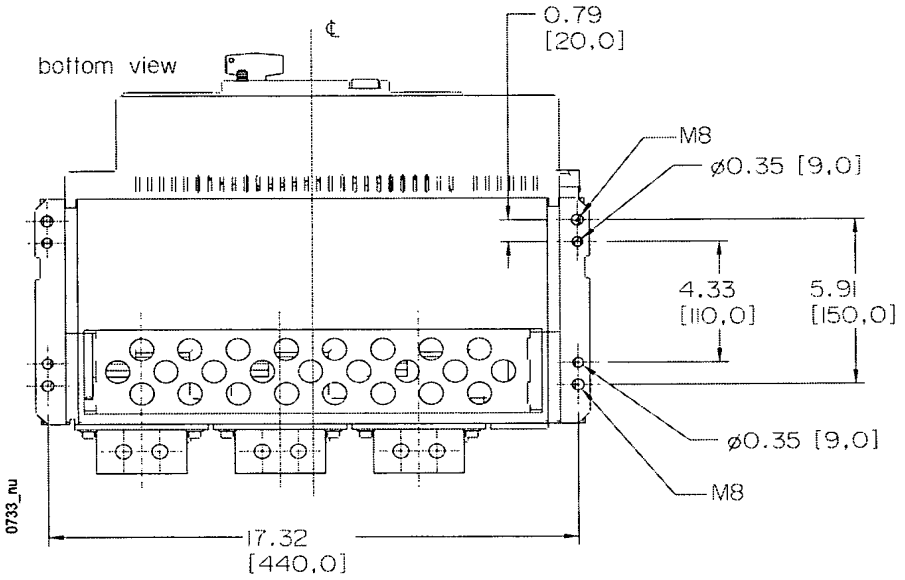
[2] Only permissible if the power circuit may be interrupted!

7.1 Baugröße I, Festeinbau

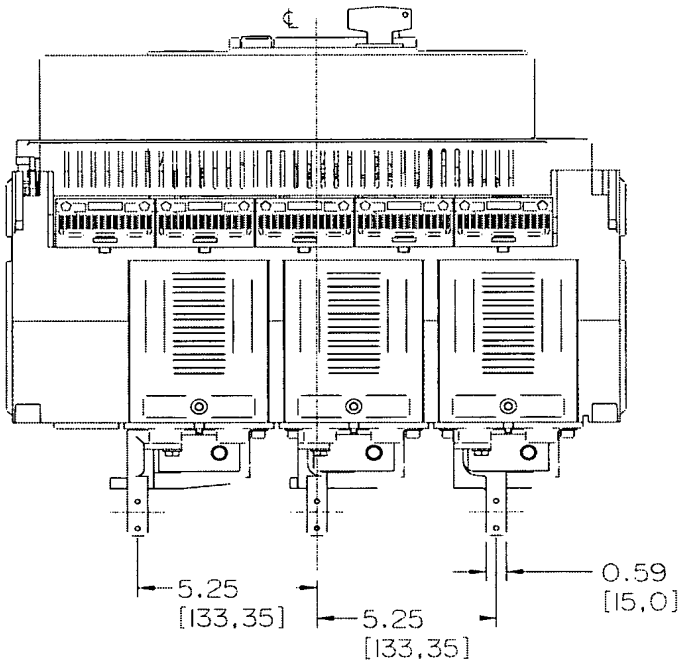
7.1 Frame size I, fixed-mounted version

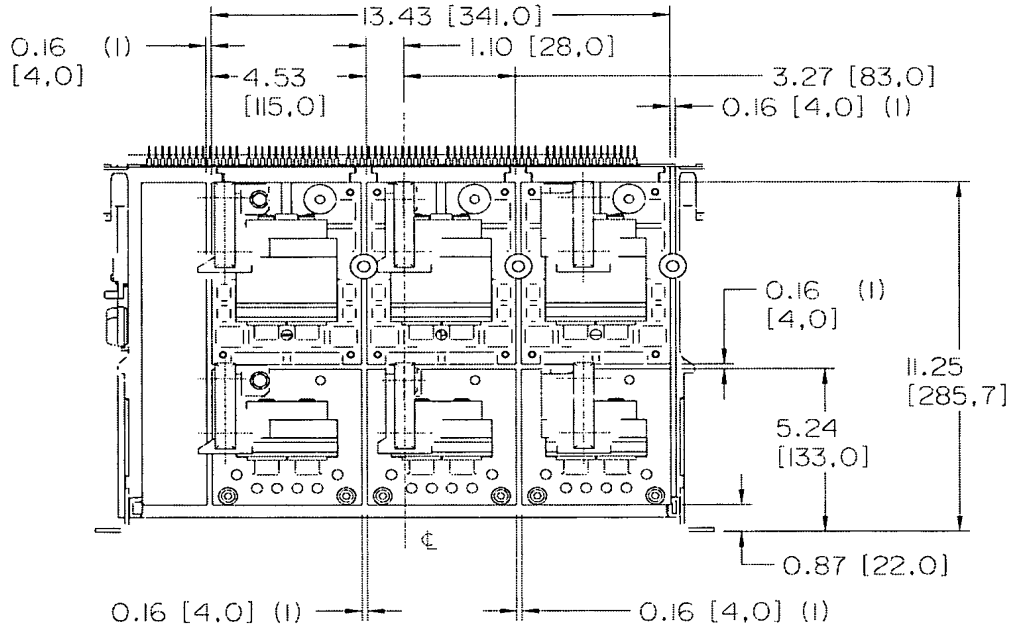



℄
5.91
[150,0]
M8
2.36
[60,0]
ø0.51
[13,0]
1.08 [27,5]
1.18
[30,0]
4.53
[115,0]
4.53
[115,0]

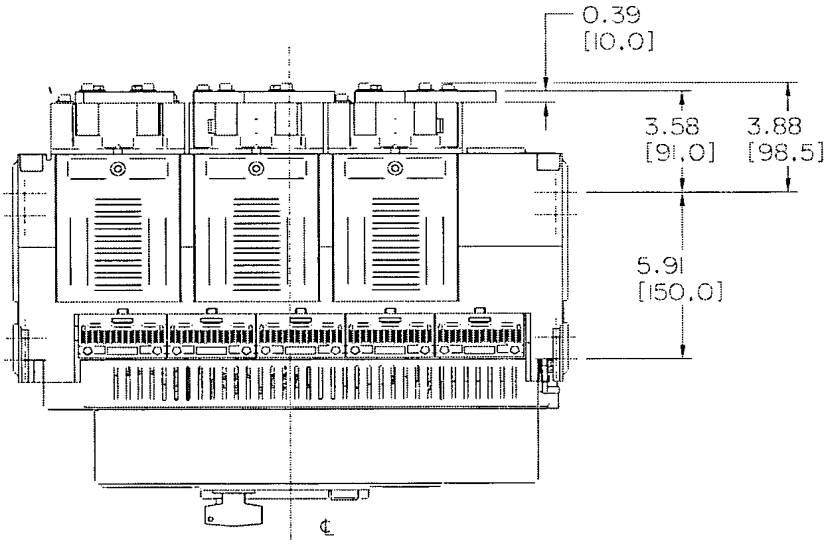

bottom view
℄
0.79
[20,0]
M8
ø0.35 [9,0]
4.33
[110,0]
5.91
[150,0]
ø0.35 [9,0]
M8
17.32
[440,0]
0733_nu

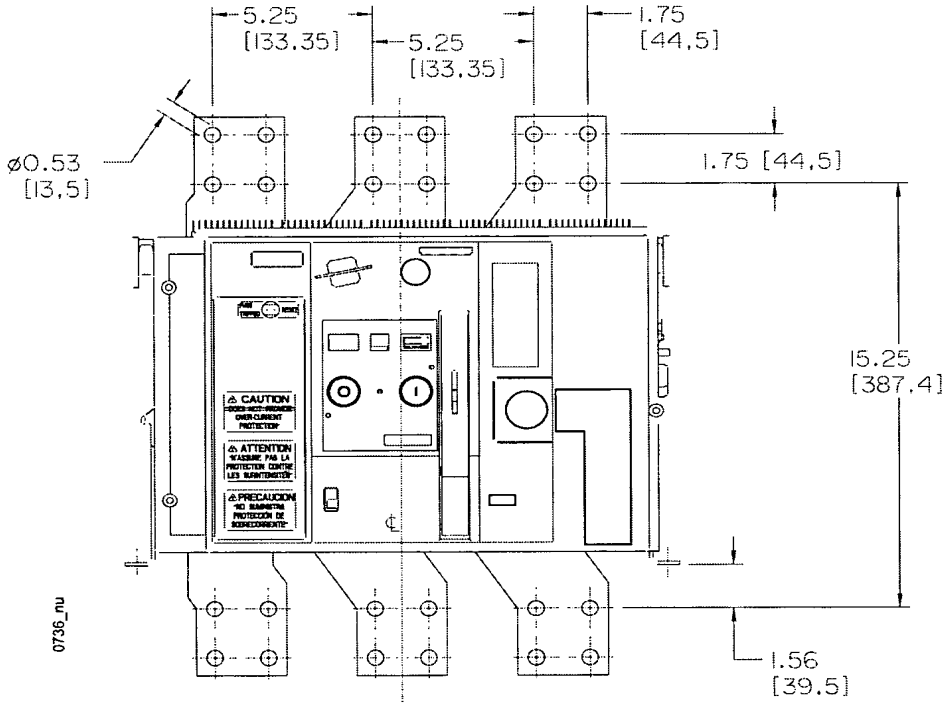
Vertikalanschlüsse **Rear vertical connectors**

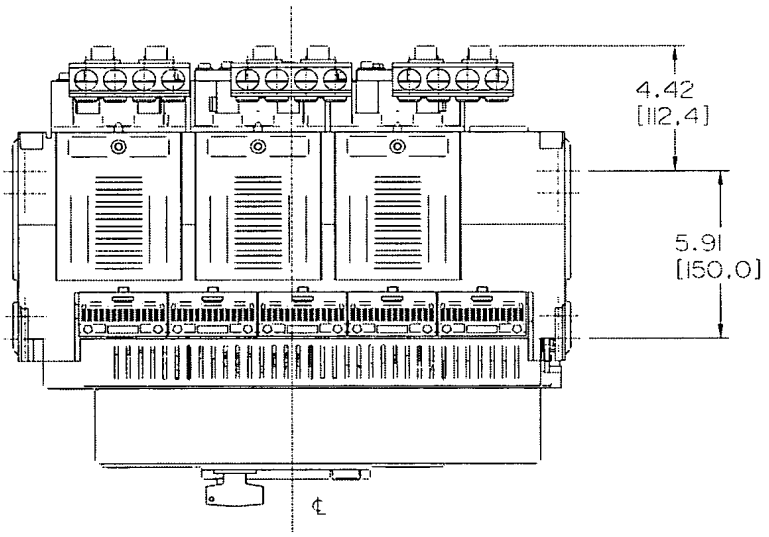


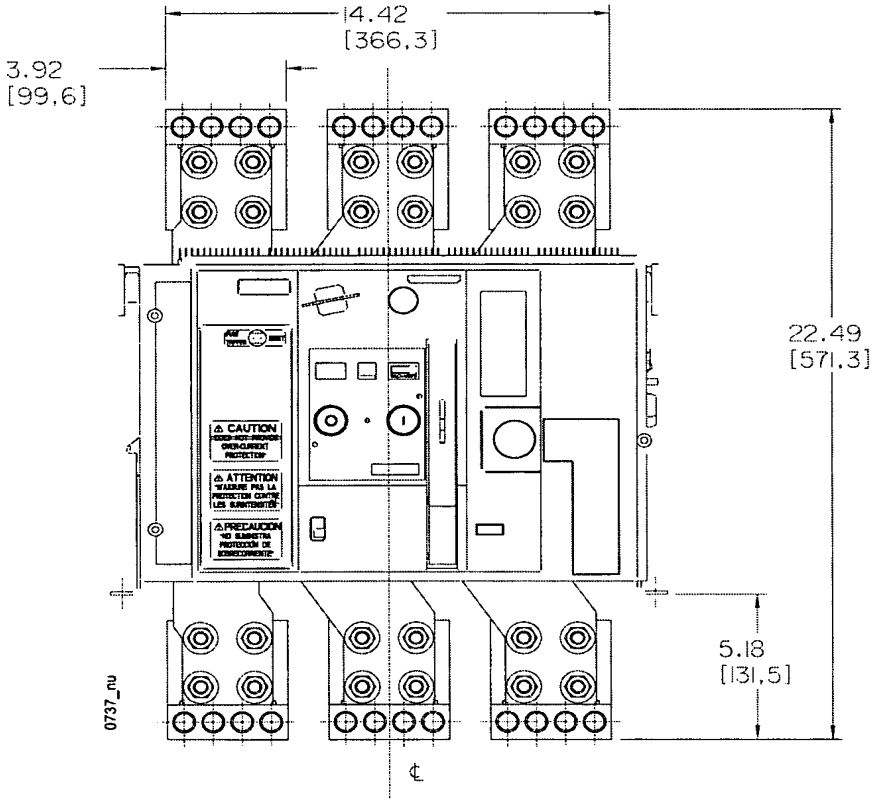


(1) = slots for insulation barriers


0.39
[10.0]
3.58
[91.0]
3.88
[98.5]
5.91
[150.0]


5.25
[133.35]
5.25
[133.35]
1.75
[44,5]
ø0.53
[13,5]
1.75 [44,5]
15.25
[387.4]
1.56
[39.5]
0736_nu

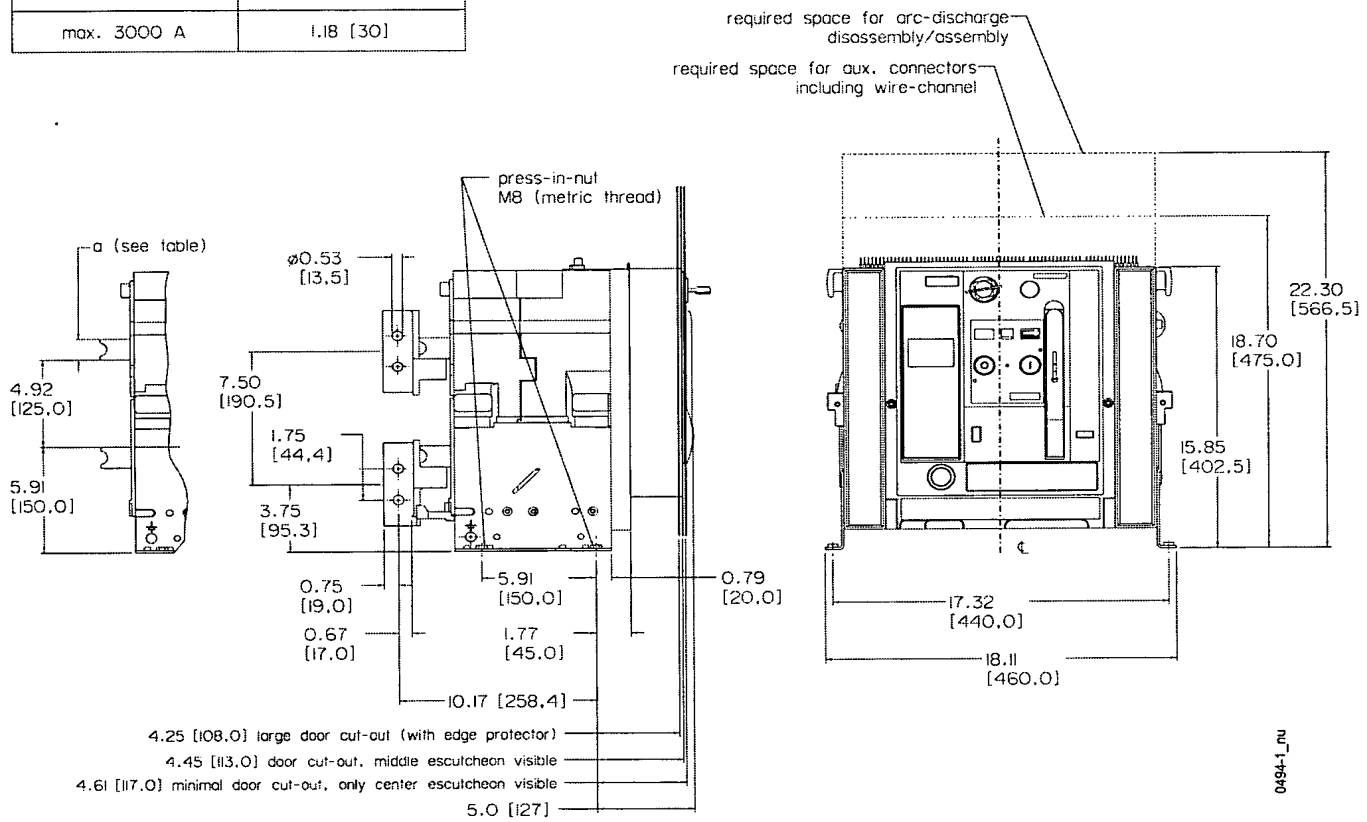

4.42
[112,4]
5.91
[150,0]
℄

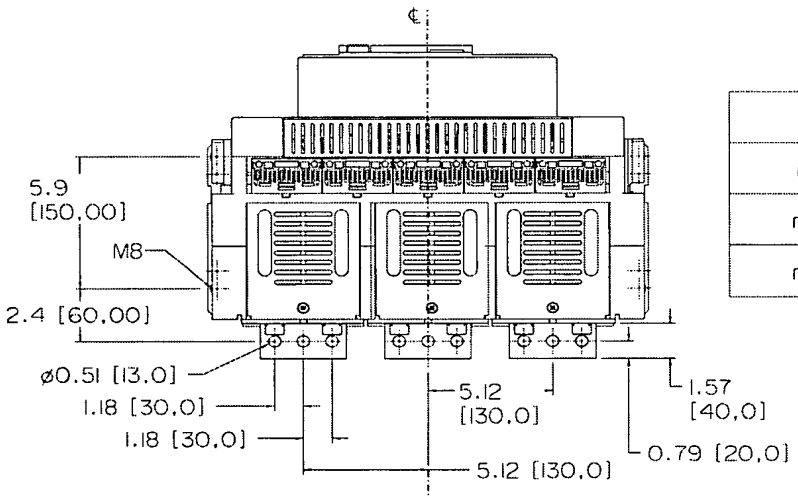

14.42
[366,3]
3.92
[99,6]
22.49
[571,3]
5.18
[131,5]
⚠ CAUTION
⚠ ATTENTION
⚠ PRECAUCION
0737_nu
℄

7.2 Baugröße II, Festeinbau

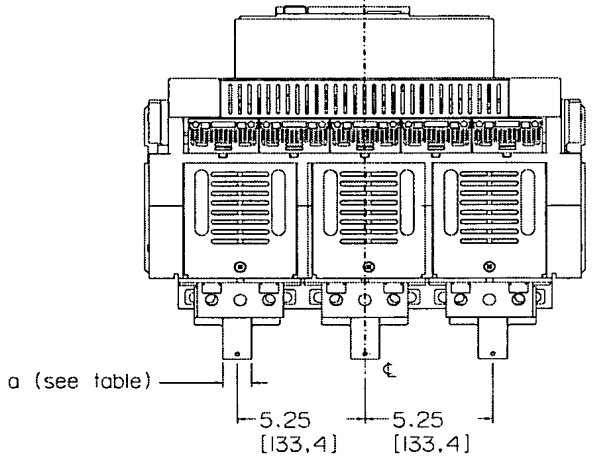
7.2 Frame size II, fixed-mounted version

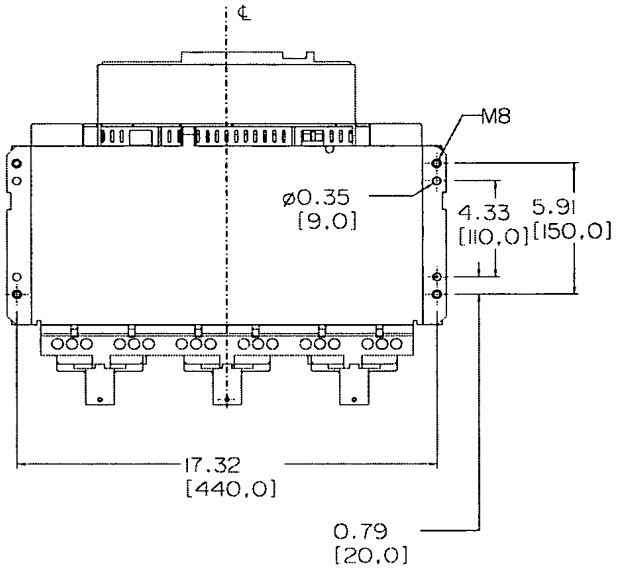
rated current	dimension a
max. 1600 A	0.39 [10]
max. 2000 A	0.59 [15]
max. 3000 A	1.18 [30]

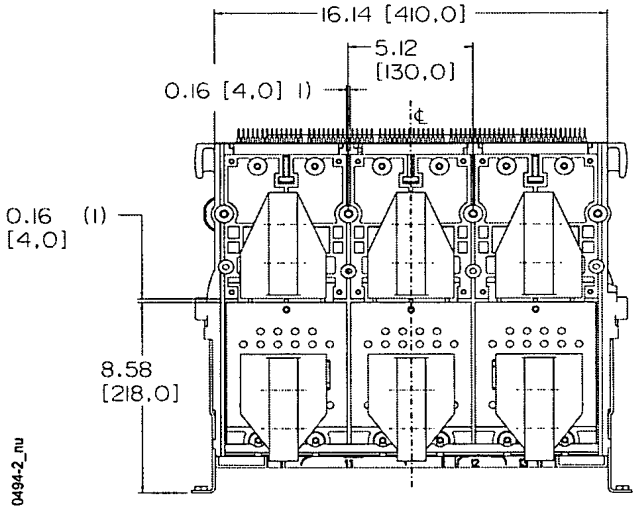




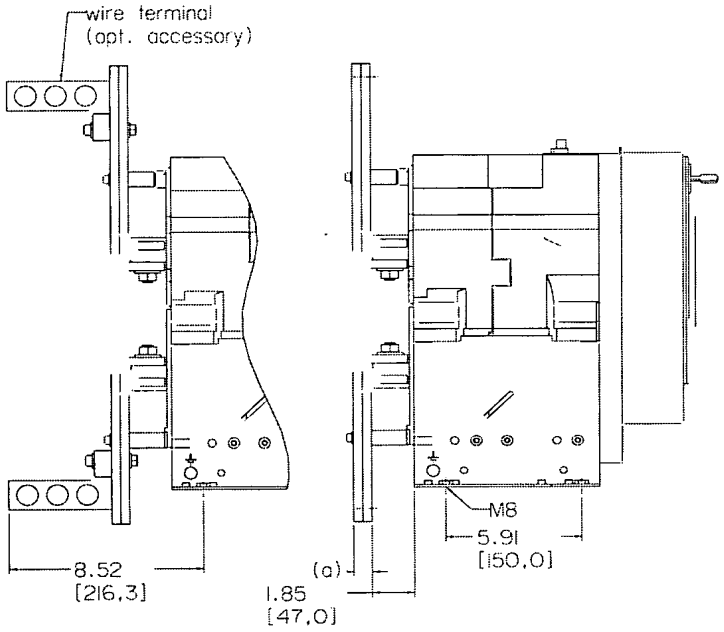
rated current	dimension a
max. 1600 A	0.39 [10]
max. 2000 A	0.59 [15]
max. 3000 A	1.18 [30]



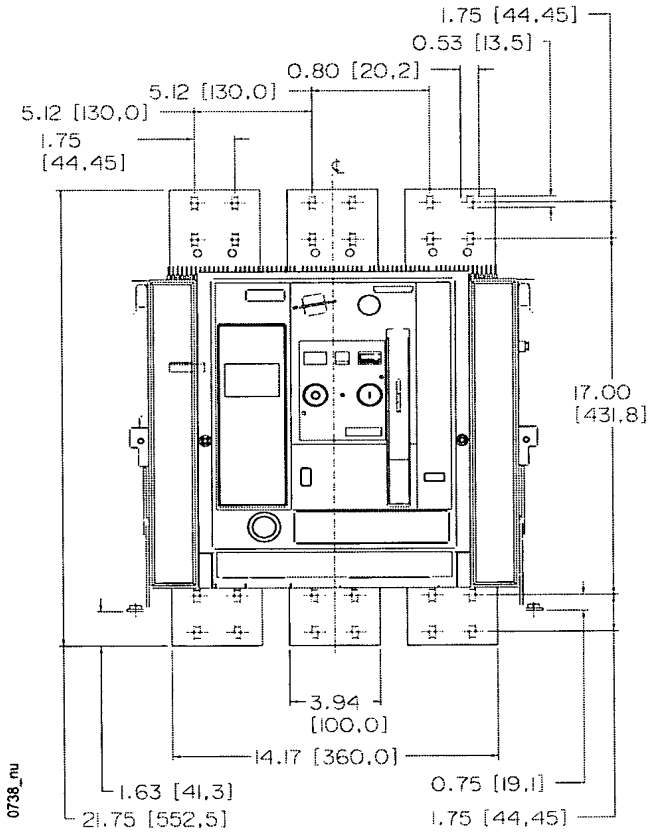




(1) = Slots 0.2 [5] for insulation barriers

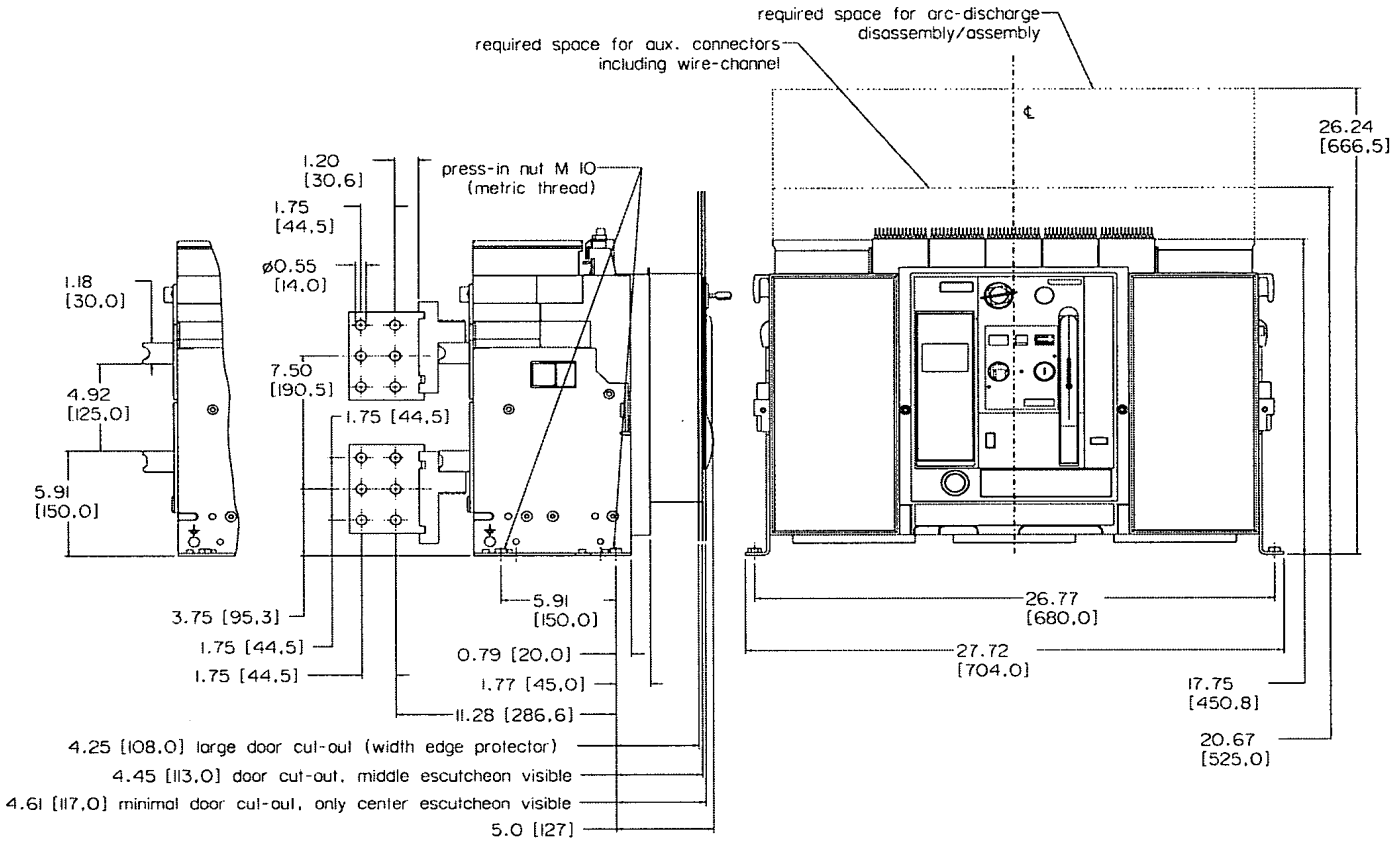


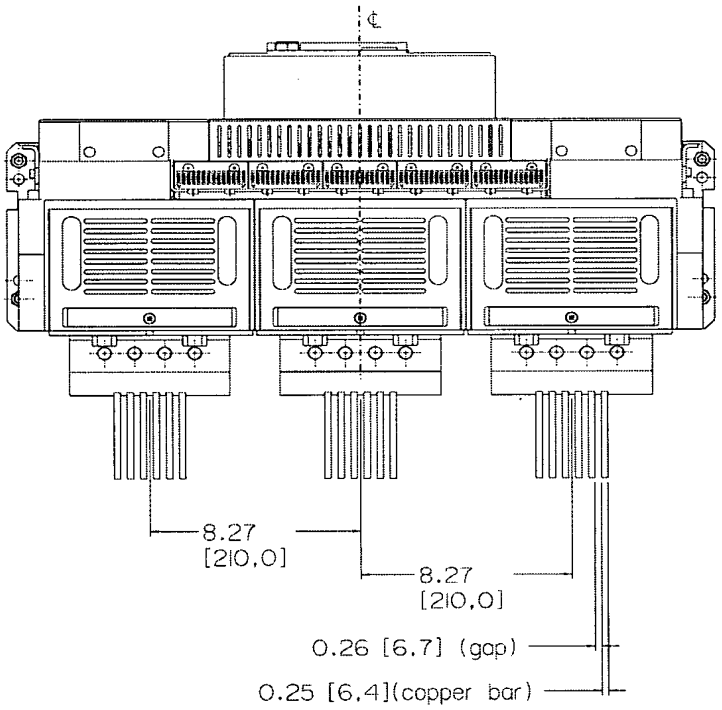
rated current	dimension a
max. 1600 A	0.39 [10]
max. 2000 A	0.79 [20]
max. 3000 A	0.79 [20]

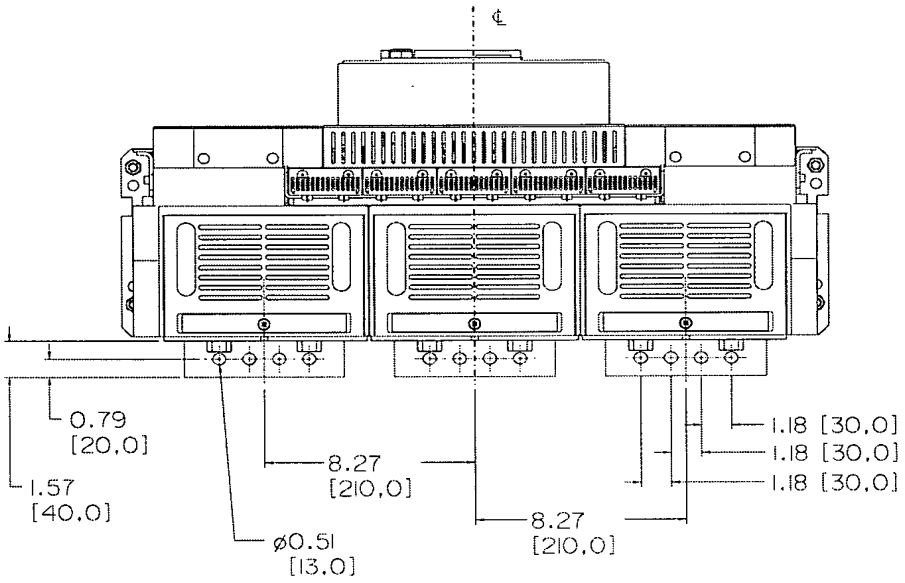


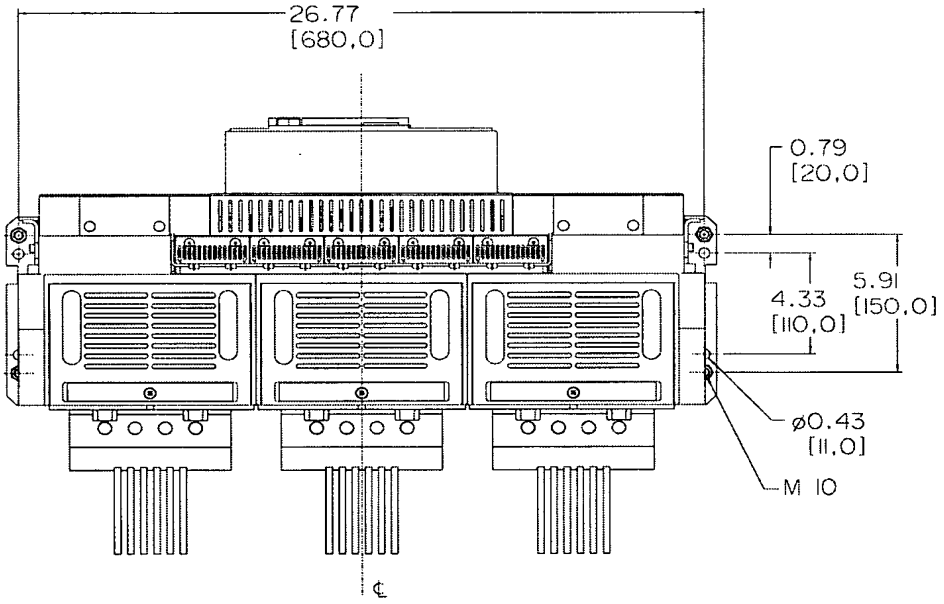
7.3 Baugröße III, Festeinbau

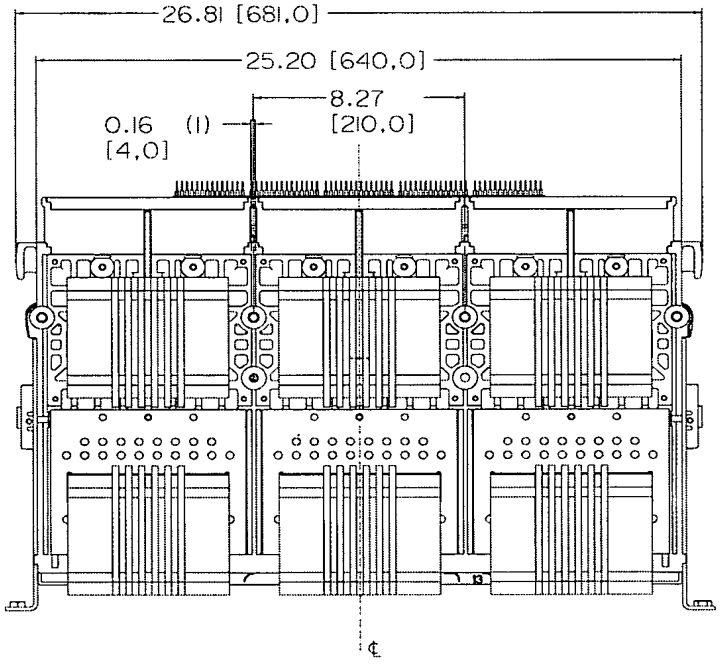
7.3 Frame size III, fixed-mounted version



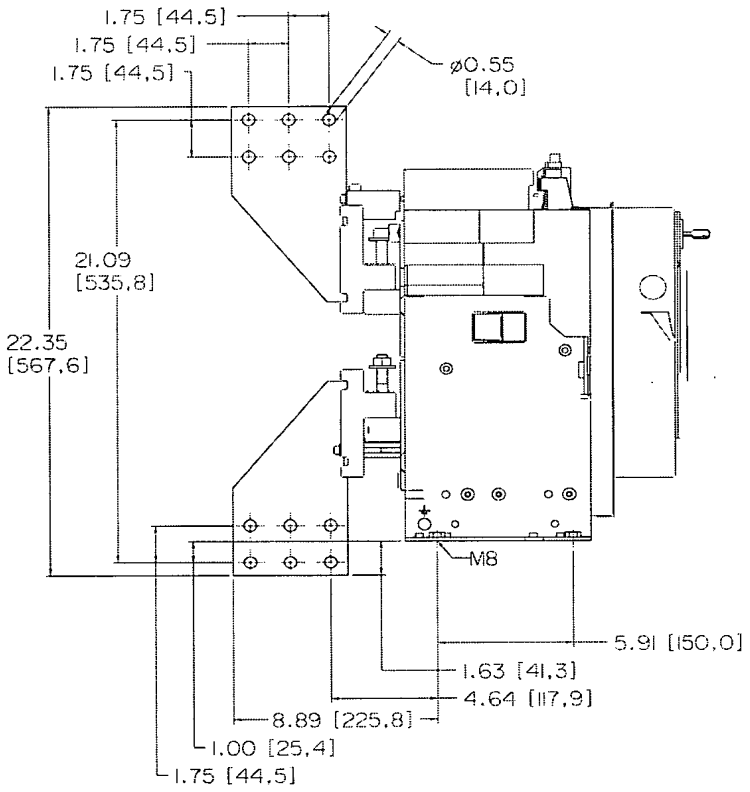

℄
8.27
[210,0]
8.27
[210,0]
0.26 [6.7] (gap)
0.25 [6,4](copper bar)

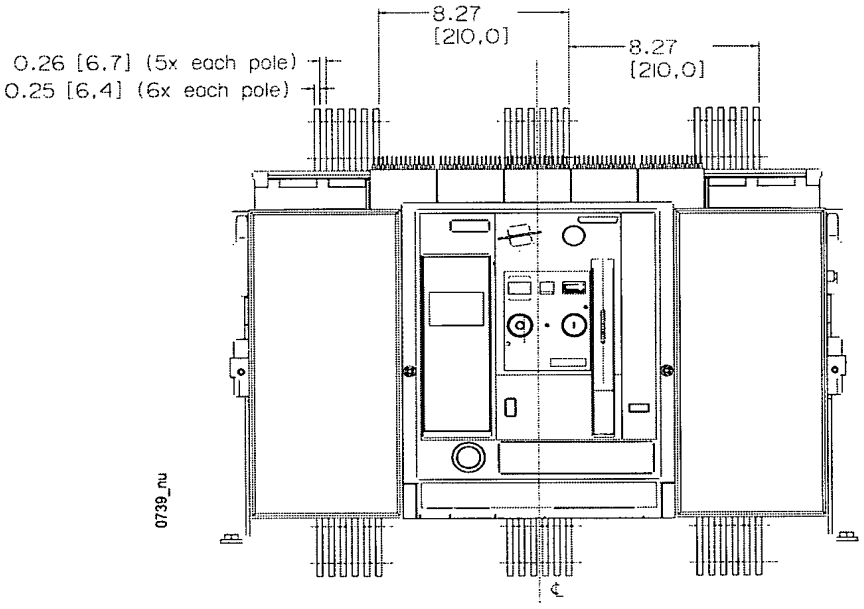

℄
0.79
[20,0]
1.57
[40,0]
8.27
[210,0]
ø0.51
[13,0]
8.27
[210,0]
1.18 [30,0]
1.18 [30,0]
1.18 [30,0]





(1) = Slots 0.2 [5] for insulation barriers


1.75 [44,5]
1.75 [44,5]
1.75 [44,5]
ø0.55
[14,0]
21.09
[535,8]
22.35
[567,6]
M8
5.91 [150,0]
1.63 [41,3]
4.64 [117,9]
8.89 [225,8]
1.00 [25,4]
1.75 [44,5]

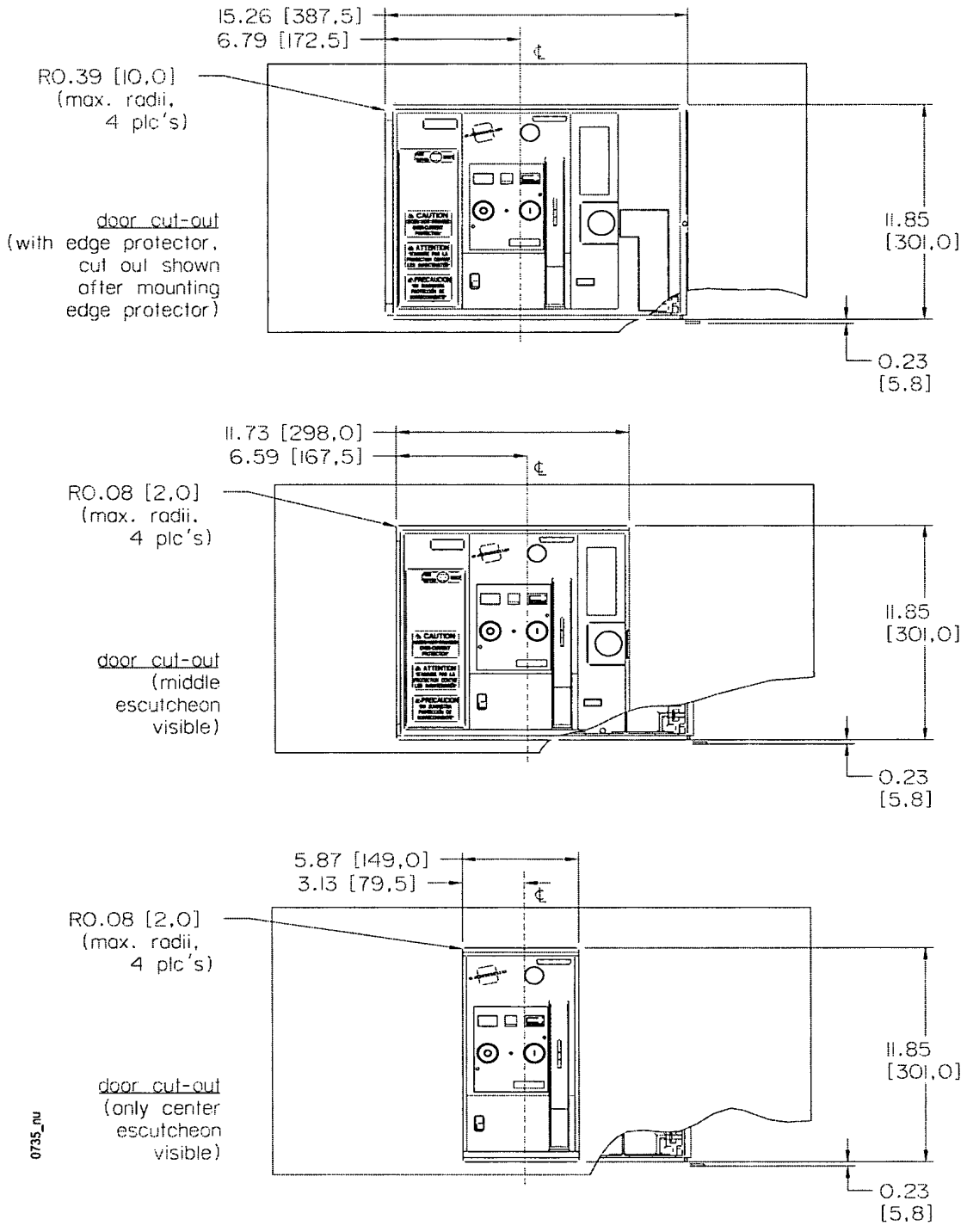

8.27
[210,0]
8.27
[210,0]
0.26 [6,7] (5x each pole)
0.25 [6,4] (6x each pole)
0739_nu

7.4 Türausschnitte, Festeinbauschalter

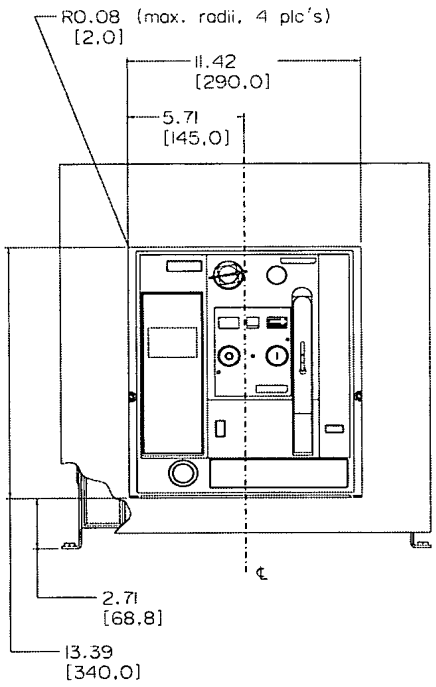
Baugröße I

7.4 Door cut-outs, fixed-mounted circuit breaker

Frame size I

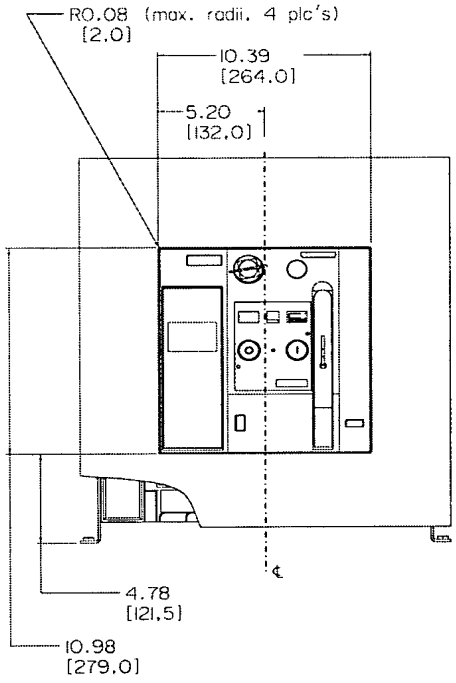


Baugröße II / III

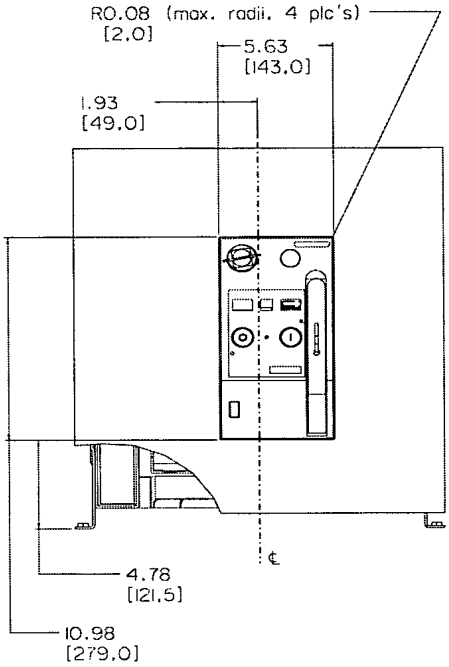


Door cut-out (with edge protector)
(Cut-out after mounting edge protector)

Frame size II / III



Door cut-out
(Middle escutcheon visible)

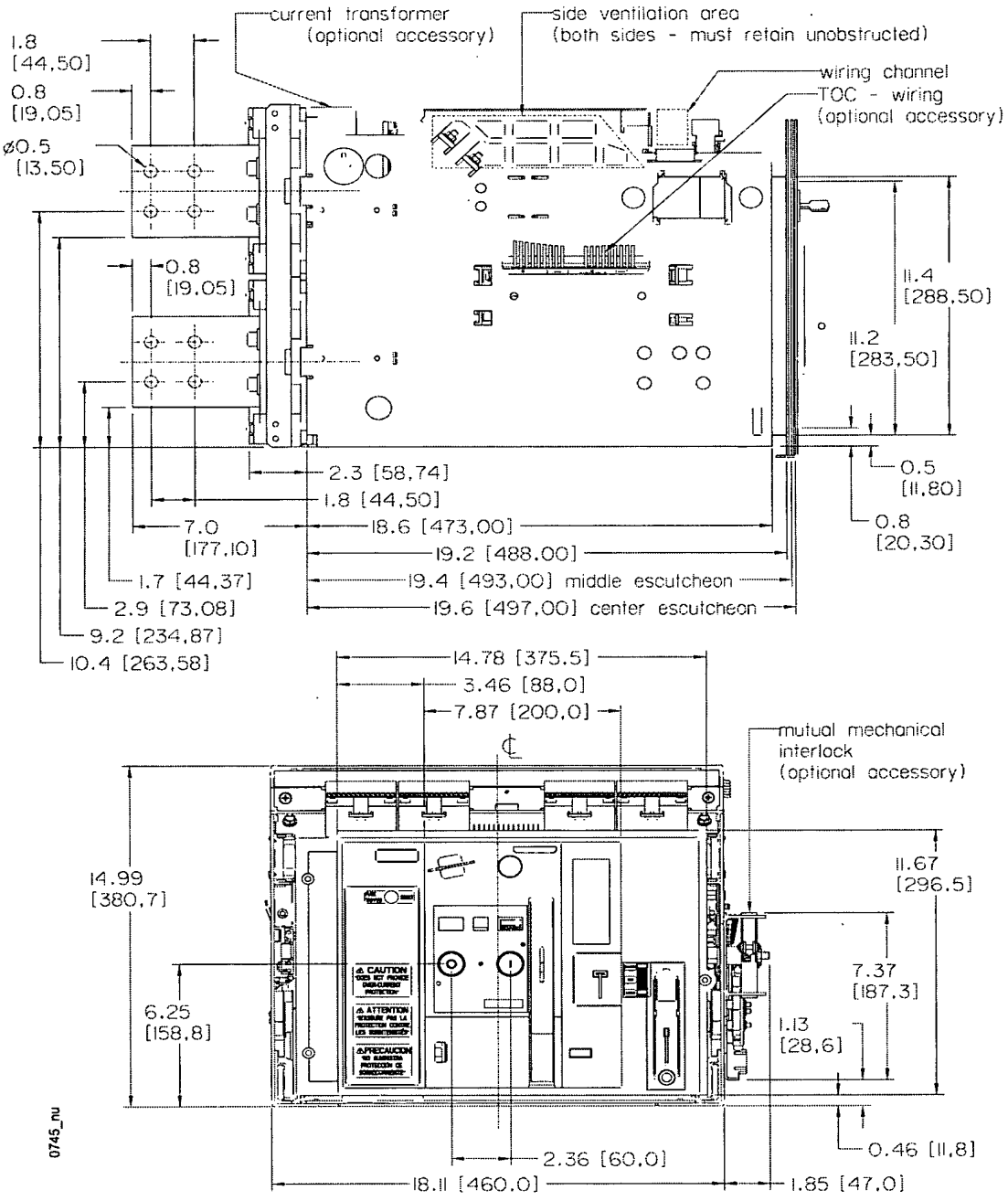


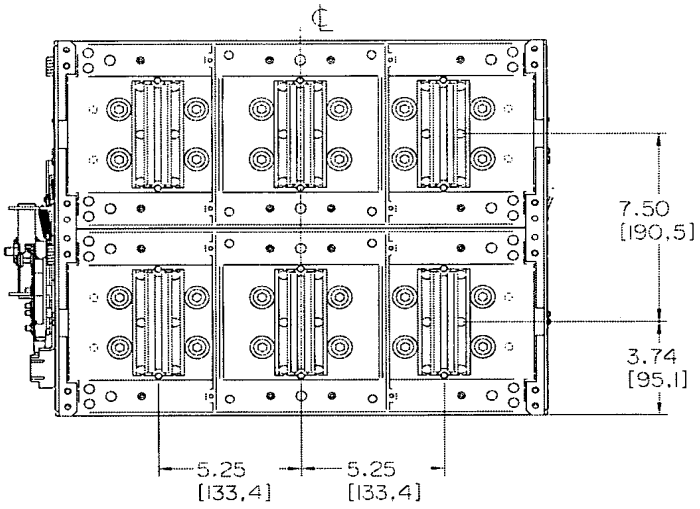
Minimal door cut-out
(Only center escutcheon visible)

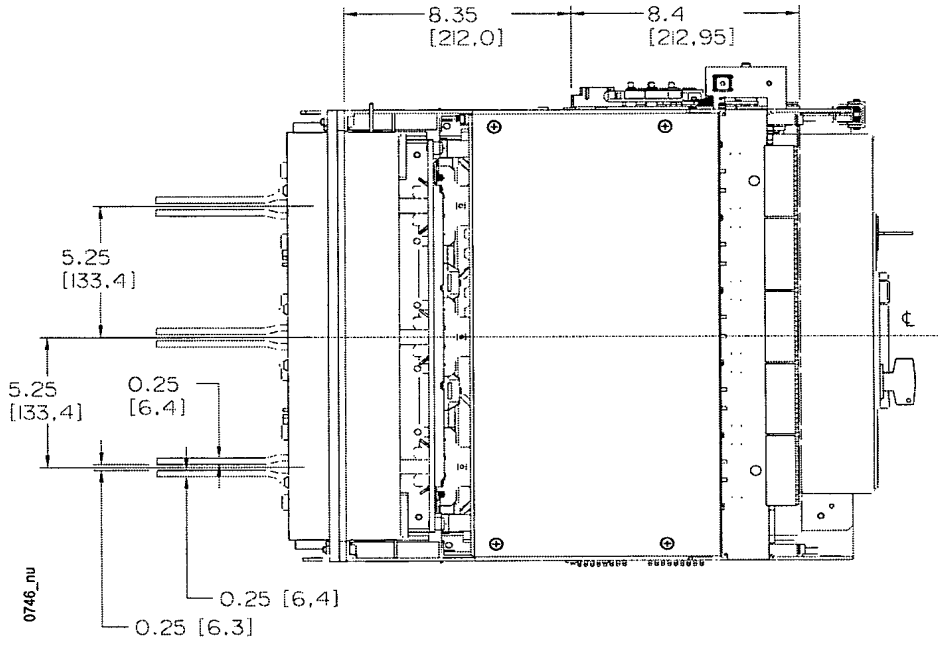
0496_nu

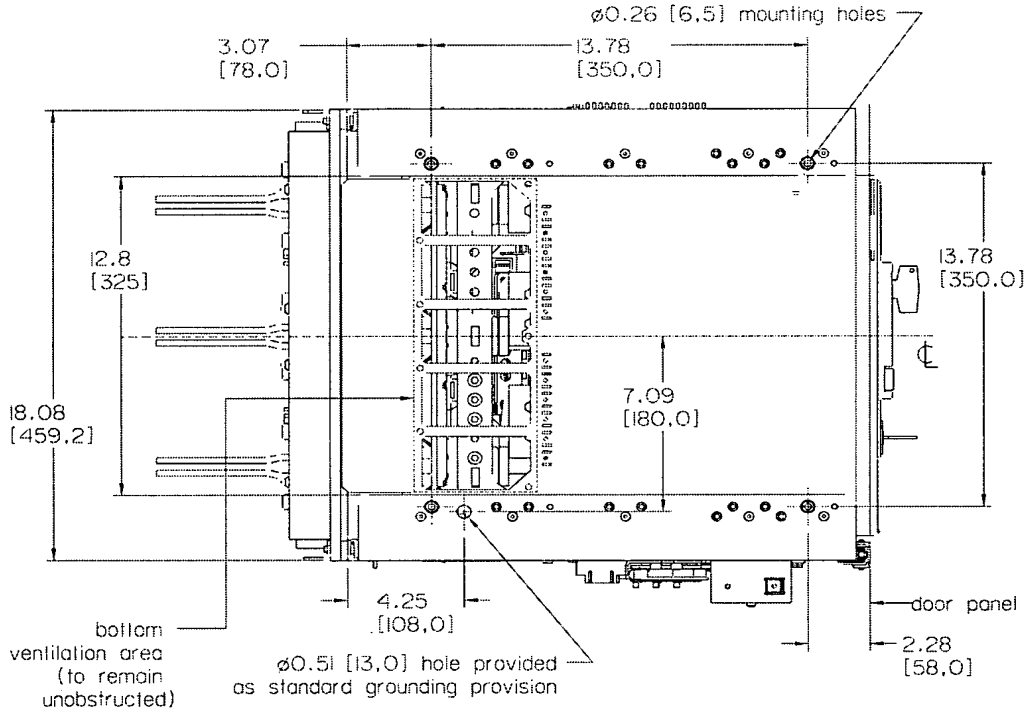
7.5 Baugröße I, Einschubausführung

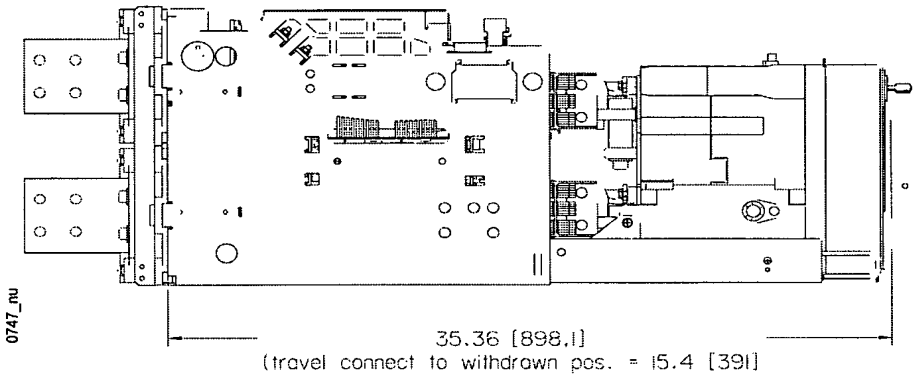
7.5 Frame size I, draw-out version

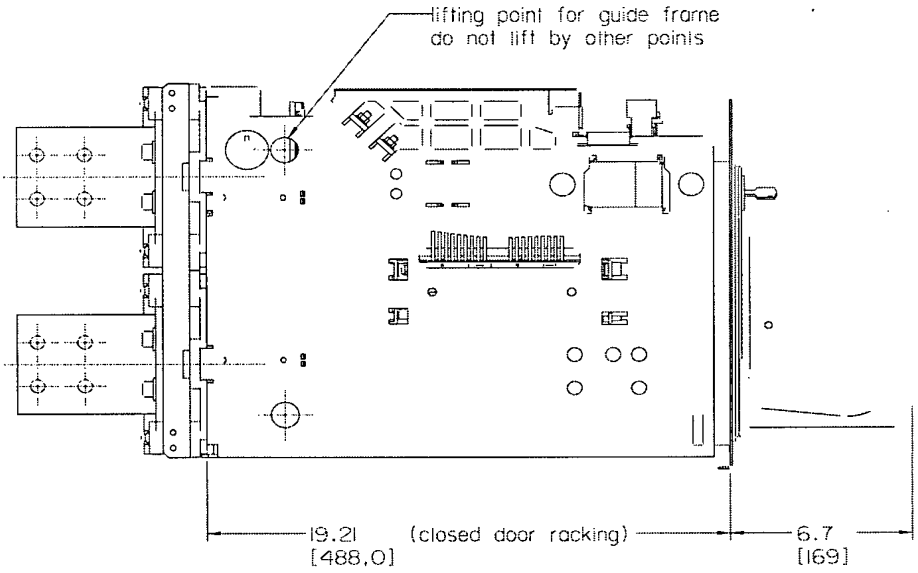


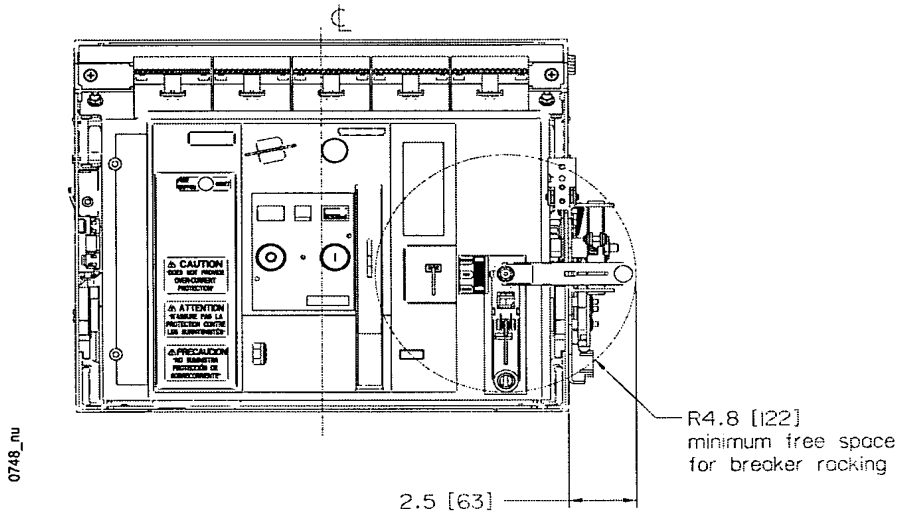

℄
7.50
[190,5]
3.74
[95,1]
5.25
[133,4]
5.25
[133,4]

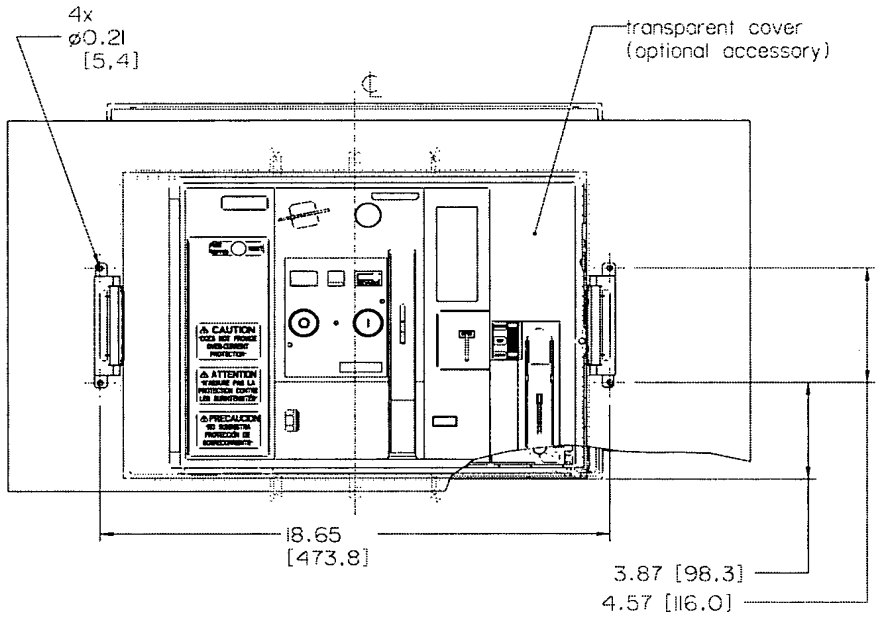

8.35
[212,0]
8.4
[212,95]
5.25
[133,4]
5.25
[133,4]
0.25
[6,4]
℄
0.25 [6,4]
0.25 [6,3]
0746_nu

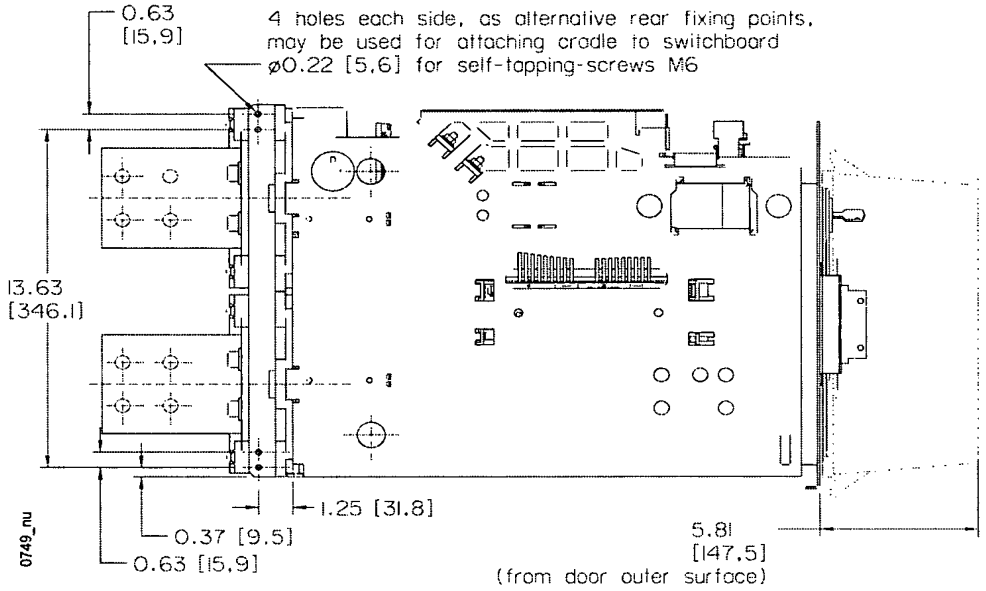

ø0.26 [6,5] mounting holes
3.07
[78.0]
13.78
[350,0]
12.8
[325]
13.78
[350.0]
18.08
[459,2]
7.09
[180,0]
4.25
[108,0]
door panel
2.28
[58,0]
bottom
ventilation area
(to remain
unobstructed)
ø0.51 [13,0] hole provided
as standard grounding provision


0747_nu
35.36 [898,1]
(travel connect to withdrawn pos. = 15.4 [391]


lifting point for guide frame
do not lift by other points
19.2I
[488,0]
(closed door racking)
6.7
[169]

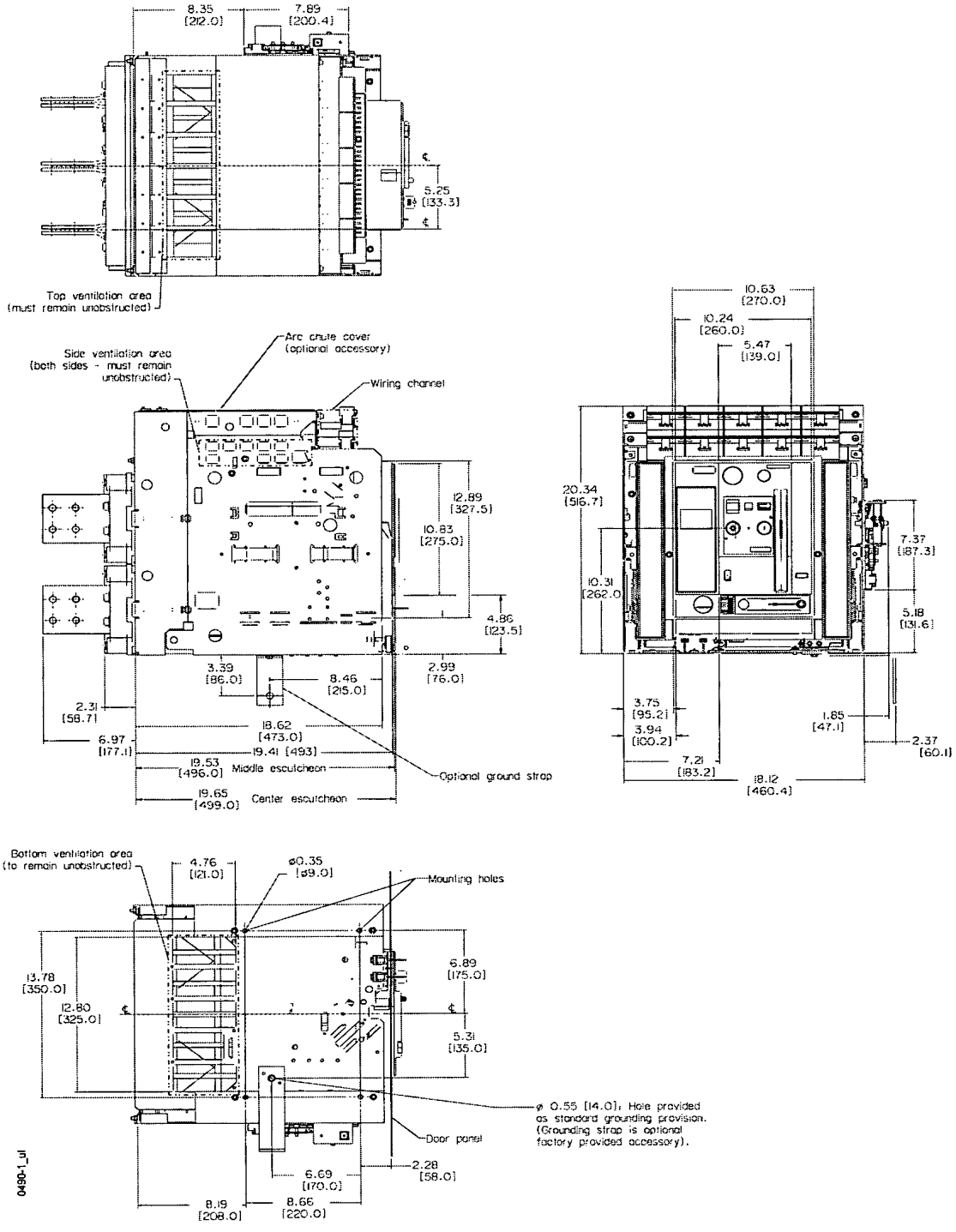

℄
R4.8 [122]
minimum free space
for breaker racking
2.5 [63]
0748_nu


4x
ø0.21
[5,4]
transparent cover
(optional accessory)
18.65
[473.8]
3.87 [98.3]
4.57 [116.0]

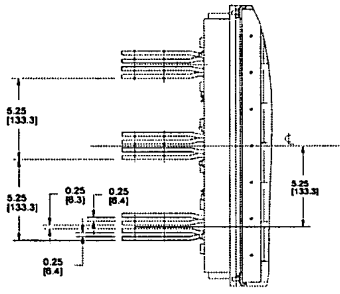

0.63
[15,9]
4 holes each side, as alternative rear fixing points,
may be used for attaching cradle to switchboard
ø0.22 [5,6] for self-tapping-screws M6
13.63
[346.1]
1.25 [31.8]
0.37 [9.5]
0.63 [15,9]
5.81
[147,5]
(from door outer surface)
0749_nu

7.6 Baugröße II, Einschubausführung

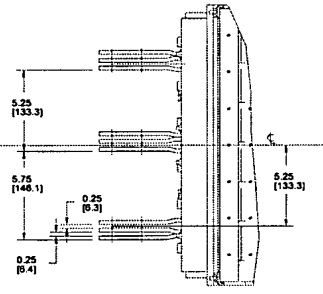
7.6 Frame size II, draw-out version



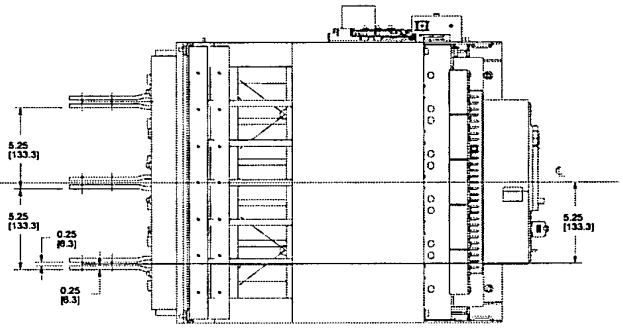
3000/3200A

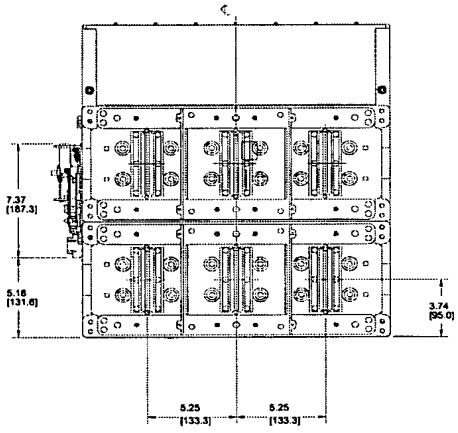


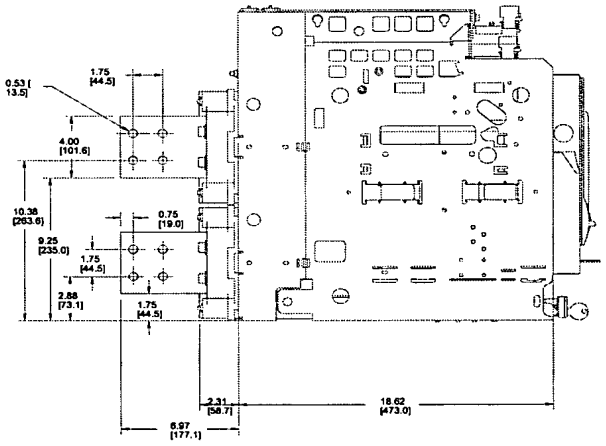
2000A



800/1600A

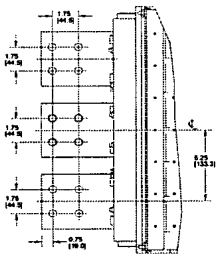




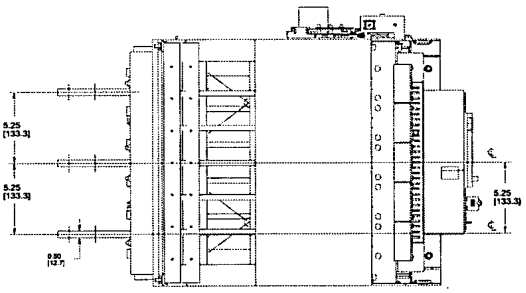


0490-2_ul

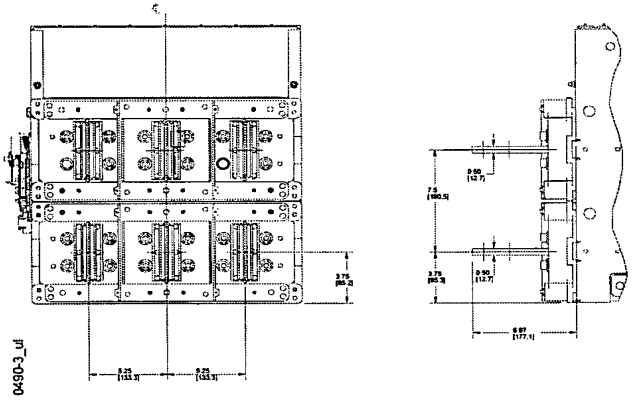
HORIZONTAL MAIN
BUS CONNECTORS



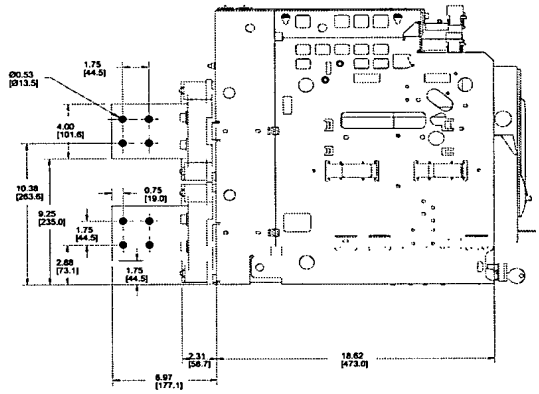
VERTICAL MAIN
BUS CONNECTORS



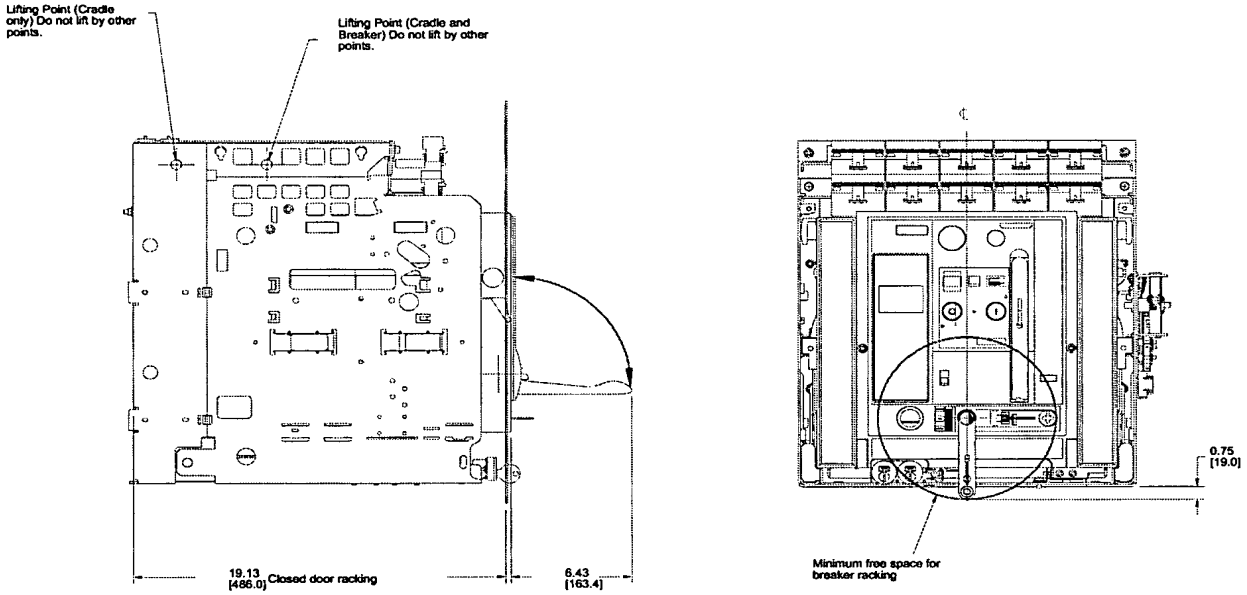
HORIZONTAL MAIN
BUS CONNECTORS

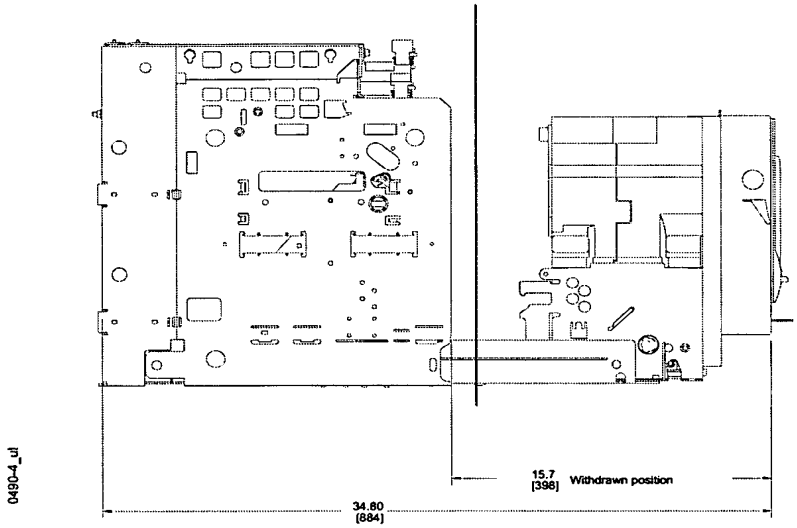


VERTICAL MAIN
BUS CONNECTORS



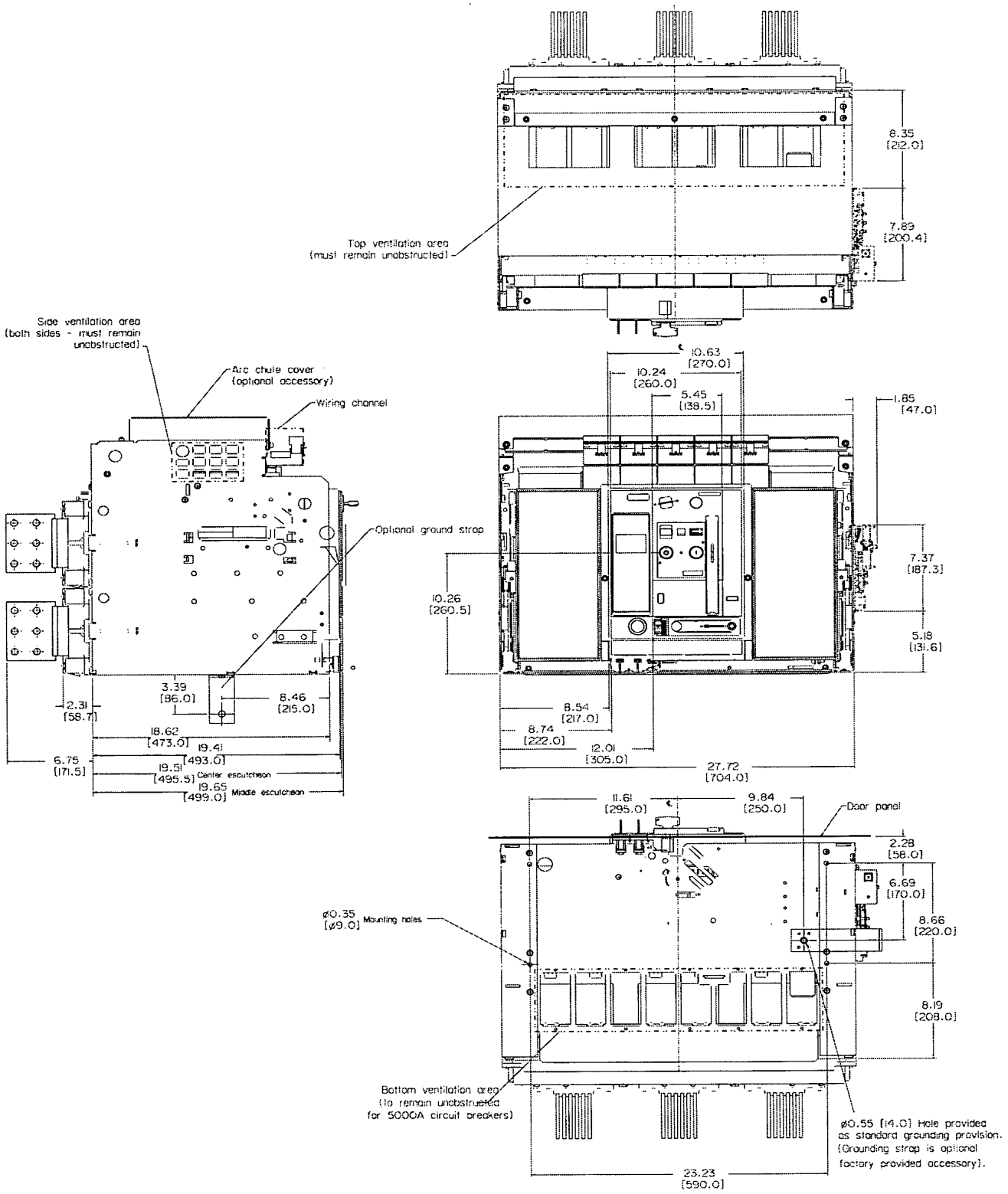
NOTE:
ROTATABLE MAIN BUS CONNECTORS ARE ONLY AVAILABLE UNDER THE FOLLOWING CONDITIONS:
(1) ONLY ACCETABLE FOR FS2 800A - 2000A FRAME SIZES
(2) ONLY ACCETABLE FOR SHORT CIRCUIT RATINGS OF 85kAIC OR LESS

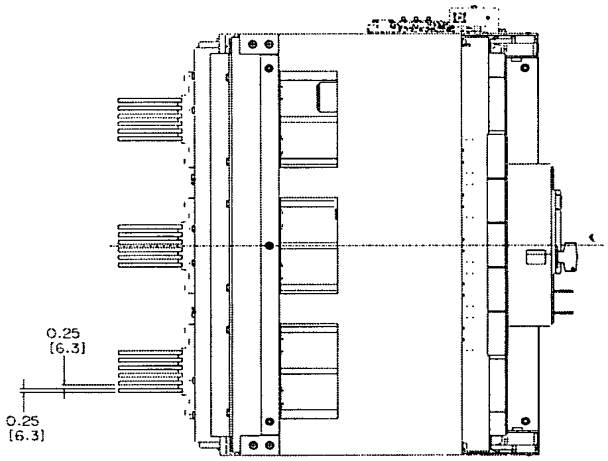

Lifting Point (Cradle only) Do not lift by other points.
Lifting Point (Cradle and Breaker) Do not lift by other points.
19.13
[486.0]
Closed door racking
6.43
[163.4]
0.75
[19.0]
Minimum free space for breaker racking

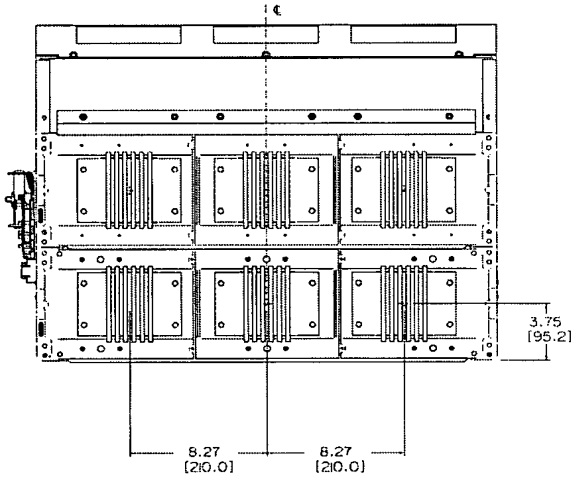

0490-4_ul
15.7
[398]
Withdrawn position
34.80
[884]

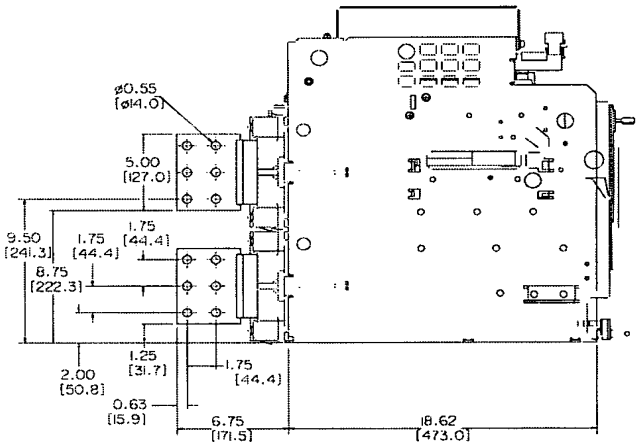
7.7 Baugröße III, Einschubausführung

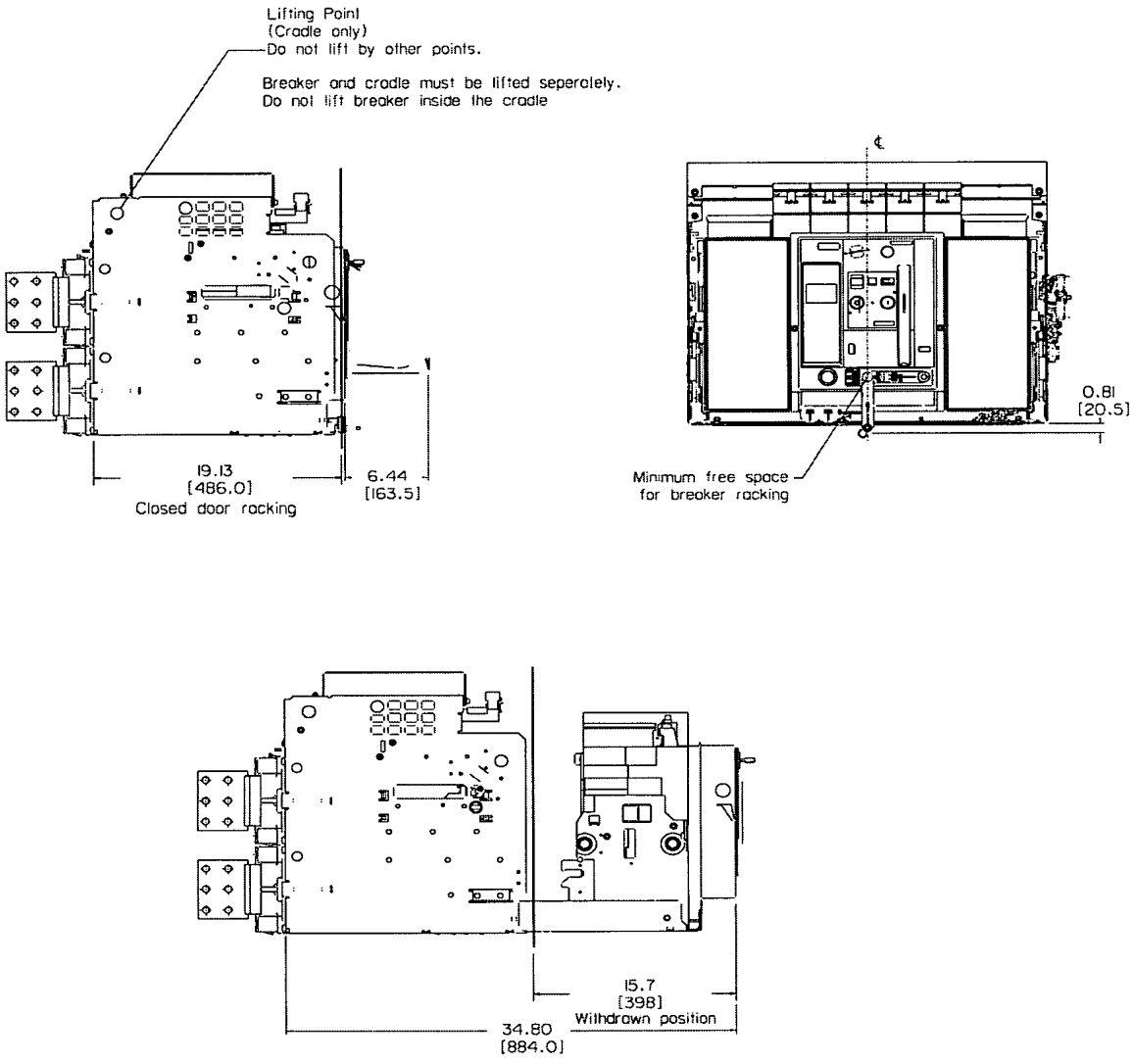
7.7 Frame size III, draw-out version




0.25
[6.3]
0.25
[6.3]


3.75
[95.2]
8.27
[210.0]
8.27
[210.0]


ø0.55
[ø14.0]
5.00
[127.0]
9.50
[241.3]
1.75
[44.4]
1.75
[44.4]
8.75
[222.3]
2.00
[50.8]
1.25
[31.7]
1.75
[44.4]
0.63
[15.9]
6.75
[171.5]
18.62
[473.0]

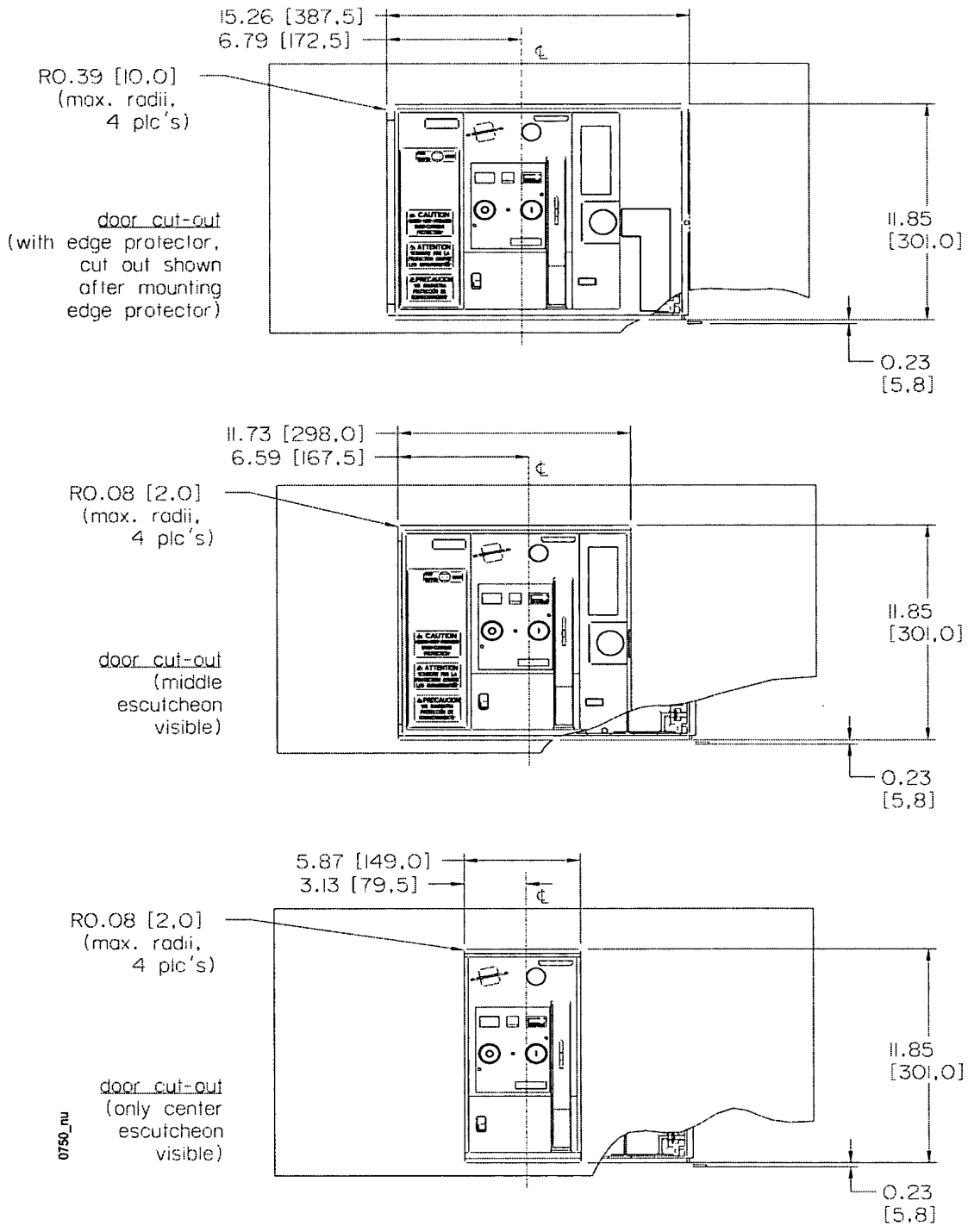

Lifting Point
(Cradle only)
Do not lift by other points.
Breaker and cradle must be lifted seperately.
Do not lift breaker inside the cradle
19.13
[486.0]
Closed door racking
6.44
[163.5]
0.81
[20.5]
Minimum free space
for breaker racking
15.7
[398]
Withdrawn position
34.80
[884.0]

7.8 Türausschnitte für Einschubschalter

Baugröße I

7.8 Door cut-outs for draw-out circuit breakers

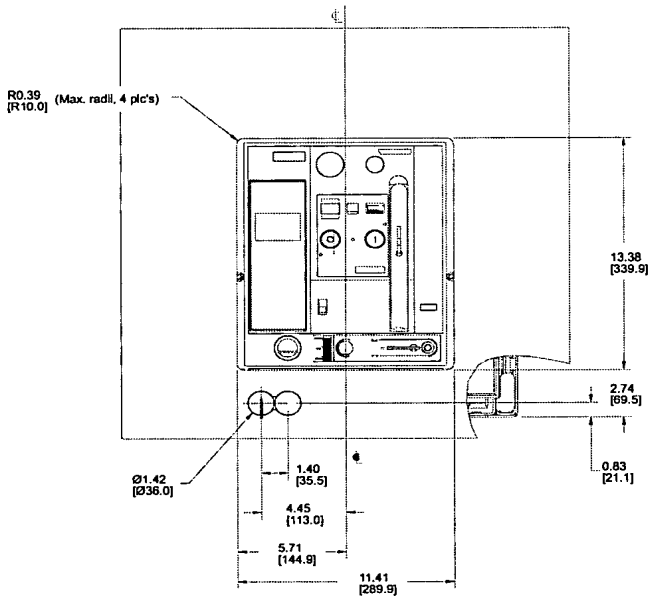
Frame size I



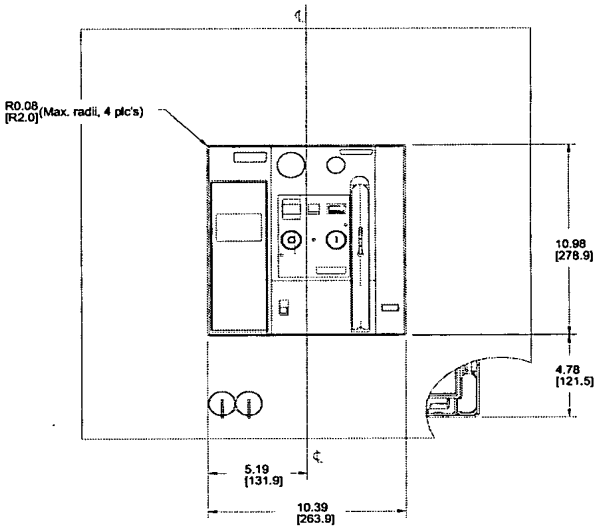
Baugröße II / III

Frame size II / III

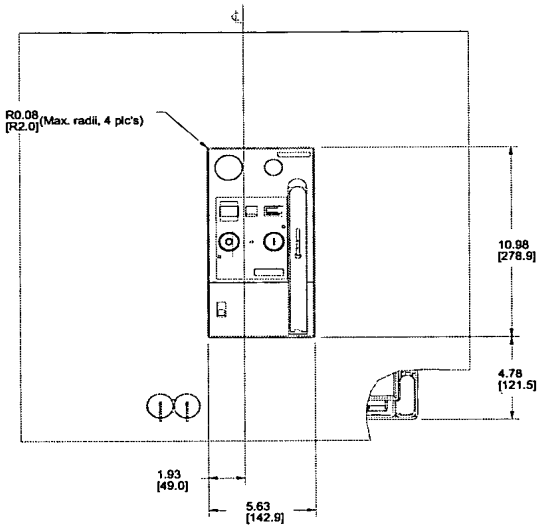
Door cut-out (with edge protector)
(Cut-out after mounting edge protector)



Door cut-out
(Middle escutcheon visible)

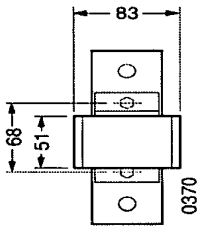


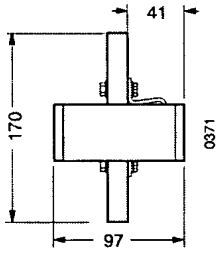
Minimal door cut-out
(Only center escutcheon visible)

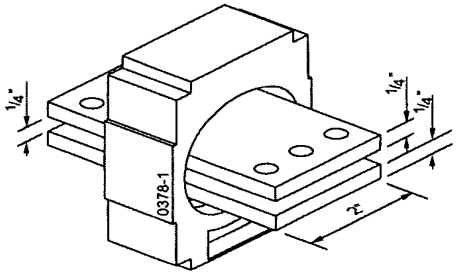


7.9 Externer Wandler für Neutralleiter

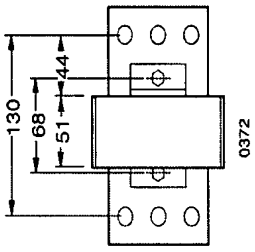
Größe I

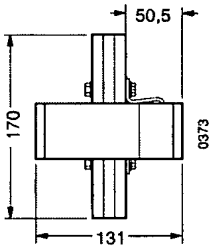


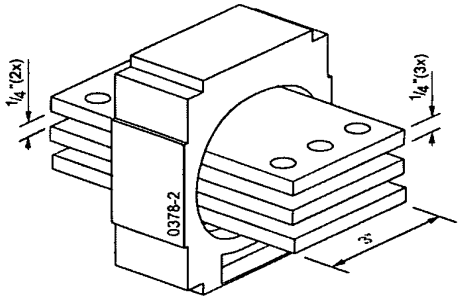




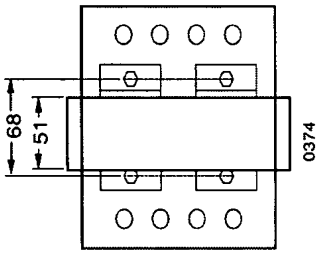
Größe II

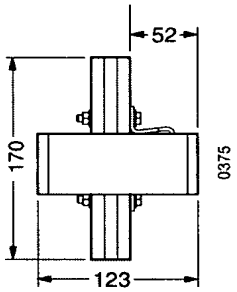


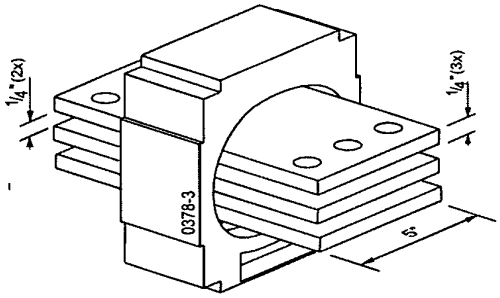




Größe III







N-Leiter Wandler können je nach erforderlichen Schienenquerschnitt gewählt werden, unabhängig von der Schalterbaugröße.

→ Nachrüsten (Seite 9-120)

7.10 Weitere Maßbilder

- Türdichtungsrahmen → (Seite 22-1)
- Abdeckhaube → (Seite 23-1)

7.9 External sensor for neutral conductor

Size I

Size II

Size III

Neutral sensors may be used according to the necessary bus bar dimensions, regardles of the frame size of the breaker.

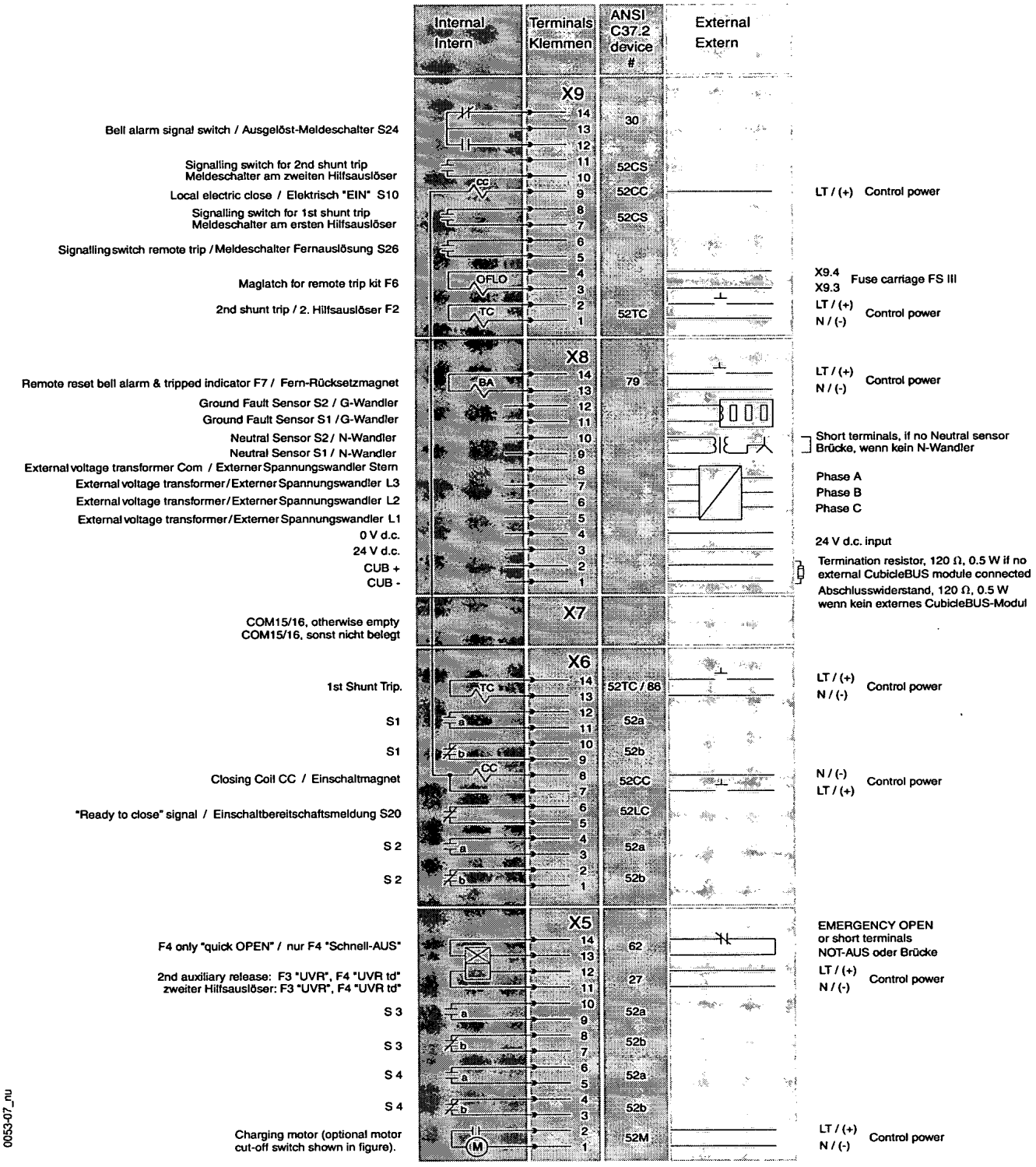
→ Field install (page 9-120)

7.10 Further dimension drawings

- Door sealing frame → (page 22-1)
- Shrouding cover → (page 23-1)

8.1 Klemmenbelegung

8.1 Terminal assignment



0053-07_nu

SIEMENS

Siemens Energy & Automation, Inc.

3333 Old Milton Parkway
Alpharetta, GA 30005

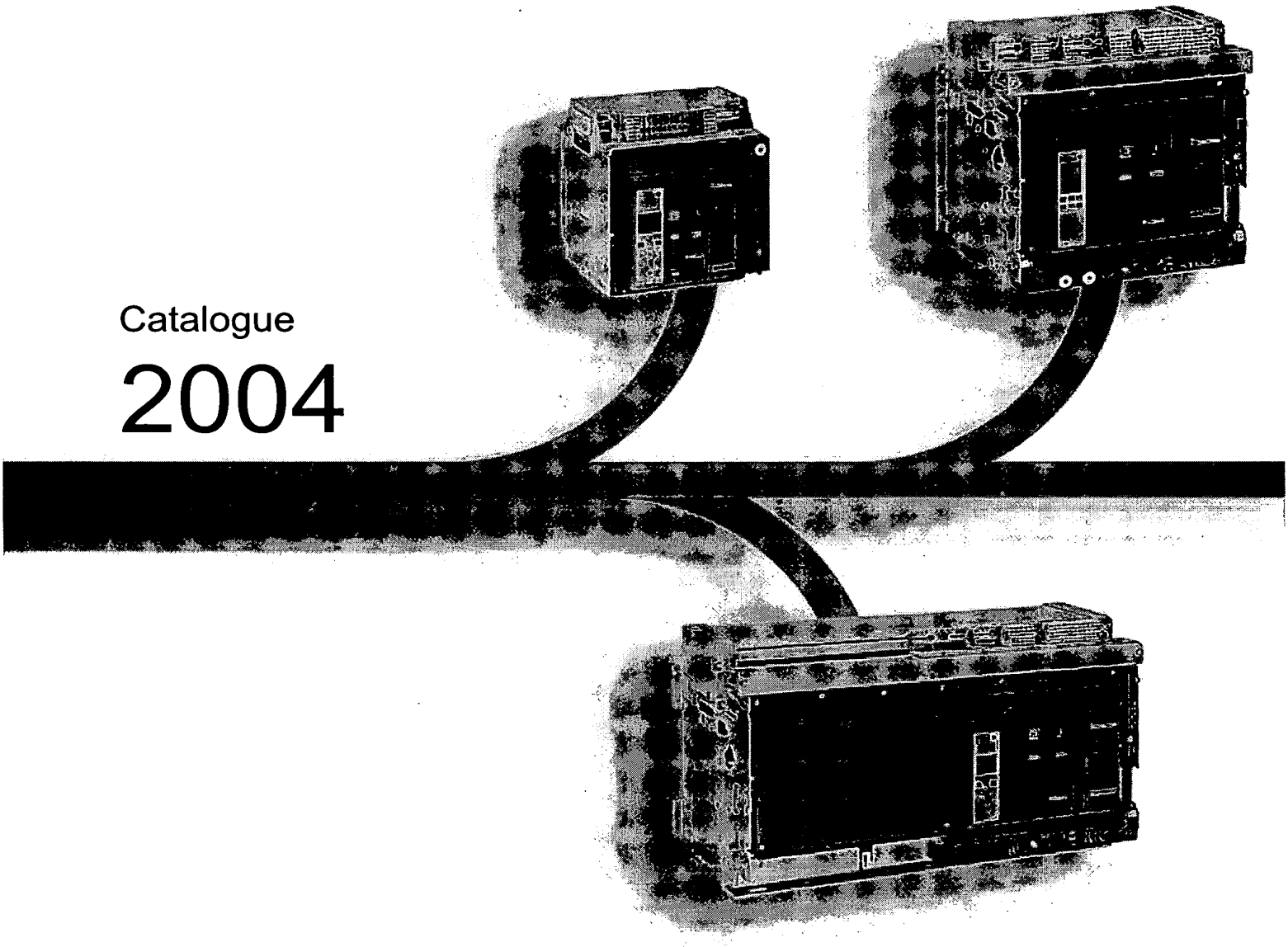
Technical assistance:
1-800-241-4453
seainfo@sea.siemens.com

www.sea.siemens.com/power

Order # CBIM-01001-0504 Printed in USA

LV power circuit breakers
and switch-disconnectors

Masterpact NT and NW



Catalogue

2004

a brand of Schneider Electric

Merlin Gerin

The Guiding System, the new way to create your electrical installations

A comprehensive offer of products with consistent design

The Guiding System is first and foremost a Merlin Gerin product offer covering all electrical distribution needs. However, what makes all the difference is that these products have been designed to operate togheter: mechanical and electrical compatibility, interoperability, modularity, communication.
Thus the electrical installation is both optimised and more efficient: better continuity of supply, enhanced safety for people and equipment, guaranteed upgradeability, effective monitoring and control.

Tools to simplify design and implementation

With the Guiding System, you have a comprehensive range of tools - the Guiding Tools - that will help you increase your product knowledge and product utilisation. Of course this is in compliance with current standards and procedures.
These tools include technical booklets and guides, design aid software, training courses, etc. and are regularly updated.

The Guiding System, combined with the know-how and creativity, allows optimised, reliable, open-ended and standard compliant installations

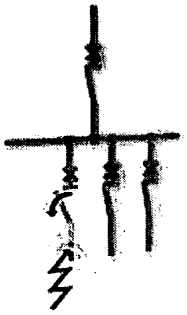
For a genuine partnership with you

Because each electrical installation is unique, there is no standard solution. With the Guiding System, the variety of combinations allows for genuine customisation solutions. You can create and implement electrical installations to meet your creative requirements and design knowledge.
You and Merlin Gerin's Guiding System form a genuine partnership.

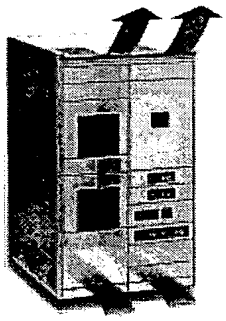
For more details on the Guiding System, consult www.merlin-gerin.com

A consistent design of offers from Medium Voltage to Ultra terminal

All Merlin Gerin offers are designed according to electrical, mechanical and communication consistency rules.
The products express this consistency by their overall design and shared ergonomics.



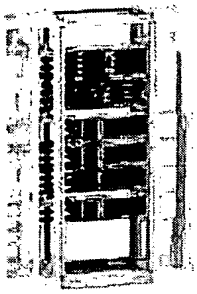
Discrimination guarantees co-ordination between the operating characteristics of serial-connected circuit-breakers. Should a fault occurs downstream, only the circuit-breaker placed immediately upstream from the fault will trip.



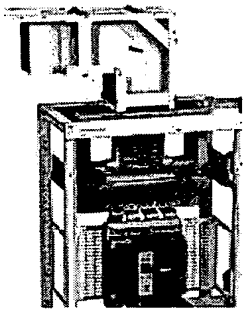
The temperature rise tests performed in the laboratory guarantee safety and durability of installations.

Electrical consistency:

Each product complies with or enhances system performance at co-ordination level: breaking capacity, Isc, temperature rise, etc. for more safety, continuity of supply (discrimination) or economic optimisation (cascading).
The leading edge technologies employed in Merlin Gerin's Guiding System ensure high performance levels in discrimination and cascading of protection devices, electrodynamic withstand of switches and current distributors, heat loss of devices, distribution blocks and enclosures.
Likewise, inter-product ElectroMagnetic Compatibilty (EMC) is guaranteed.



Prefabricated and tested solutions, upstream and downstream from the device complying with the IEC 60439-1 switchboard standard.



Direct connection of the Canalis KT busbar trunking on the Masterpact 3200 A circuit-breaker.

Mechanical consistency:

Each product adopts dimensional standards simplifying and optimising its use within the system.
It shares the same accessories and auxiliaries and complies with global ergonomic choices (utilisation mode, operating mode, setting and configuration devices, tools, etc.) making its installation and operation within the system a simpler process.

Communication consistency:

Each product complies with global choices in terms of communication protocols (Modbus, Ethernet, etc.) for simplified integration in the management, supervision and monitoring systems.

Transparent Ready

Thanks to the use of standard Web technologies, you can offer your customers intelligent Merlin Gerin switchboards allowing easy access to information: follow-up of currents, voltages, powers, consumption history, etc.

Guiding Tools for more efficient design and implementation of your installations.

Guiding Tools allow optimised use of the Guiding System offers. They simplify life and increase productivity.

SM6

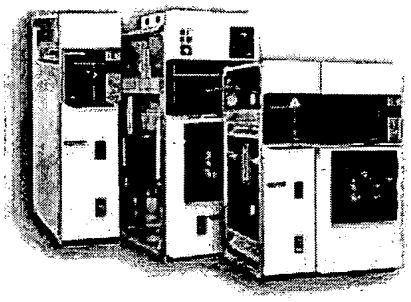
Medium voltage switchboard system from 1 to 36 kV

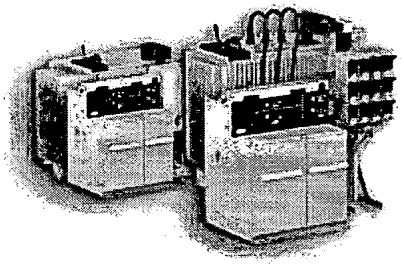
Satia

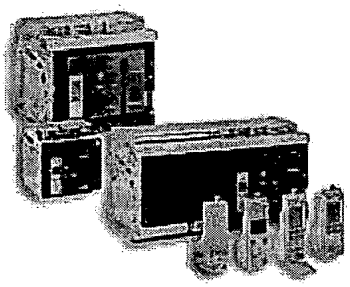
Ultra compact ML/LV substation from 250 to 630 kVA

Masterpact

Protection switchgear from 100 to 6300 A





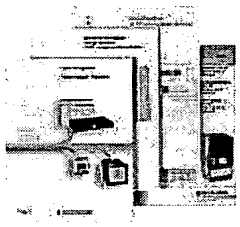


Trihal
MV/LV dry cast resin transformer from 160 to 5000 kVA

Evolis
MV vacuum switchgear and components from 1 to 24 kV.

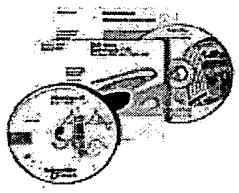
The Technical guide

These technical guides help you comply with installation standards and rules i.e.:
The electrical installation guide, the protection guide, the switchboard implementation guide, the technical booklets and the co-ordination tables all form genuine reference tools for the design of high-performance electrical installations.
For example, the LV protection co-ordination guide - discrimination and cascading - optimises choice of protection and connection devices while also increasing markedly continuity of supply in the installations.



CAD software and tools

The CAD software and tools enhance productivity and safety.
They help you create your installations by simplifying product choice through easy browsing in the Guiding System offers.
Last but not least, they optimise use of our products while also complying with standards and proper procedures.



Compact

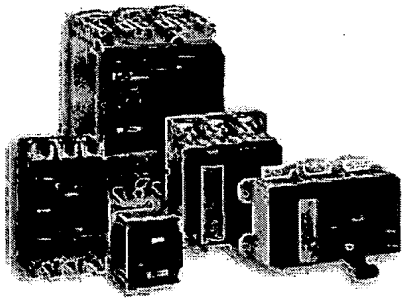
Protection switchgear system from 100 to 630 A

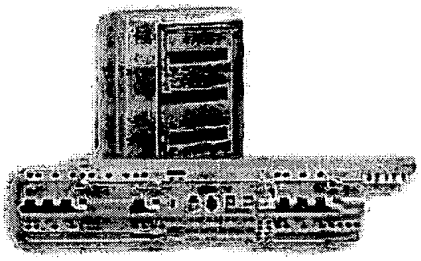
Multi 9

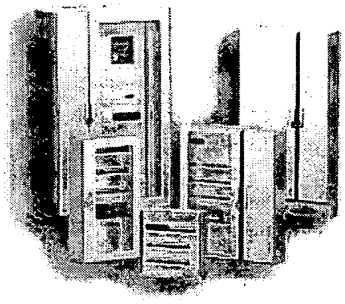
Modular protection switchgear system up to 125 A

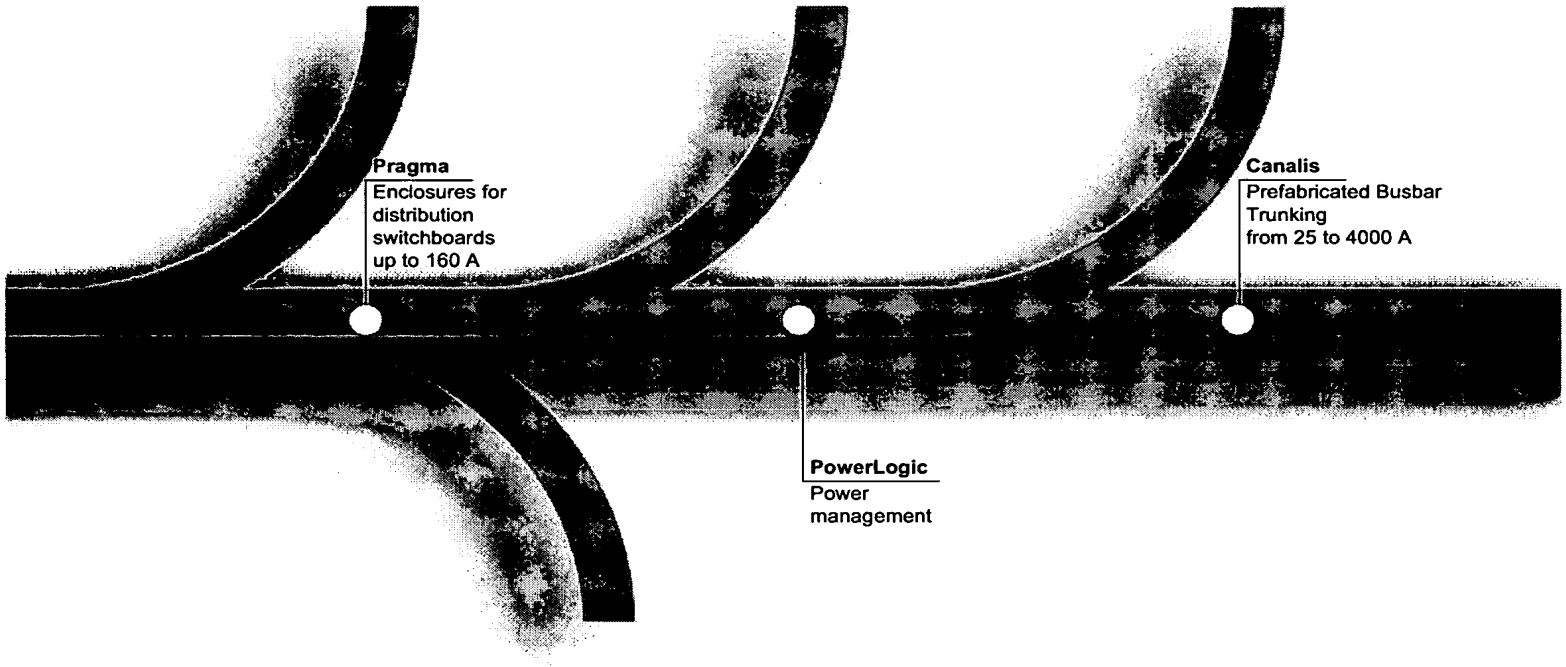
Prisma Plus

Functional system for electrical distribution switchboards up to 3200 A



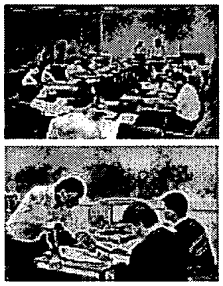


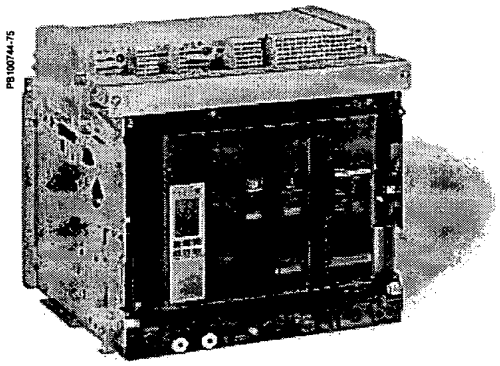




Training

Training allows you to acquire the Merlin Gerin expertise (installation design, work with power on, etc.) for increased efficiency and a guarantee of improved customer service.
The training catalogue includes beginner's courses in electrical distribution, knowledge of MV and LV switchgear, operation and maintenance of installations, design of LV installations to give but a few examples.





The original Masterpact has set a new standard for power circuit breakers around the world.

Over the years, other major manufacturers have tried to keep up by developing products incorporating Masterpact's most innovative features, including the breaking principle, modular design and the use of composite materials.

Today, Schneider Electric continues to innovate with the new Merlin Gerin Masterpact NT and NW ranges.

In addition to the traditional features of power circuit breakers (withdrawability, discrimination and low maintenance), Masterpact now offers built-in communications and metering functions, all in optimised frame sizes.

Masterpact NT and NW incorporate the latest technology to enhance both performance and safety. Easy to install, with user-friendly, intuitive operation and environment-friendly design, they are, quite simply, circuit breakers of their time.

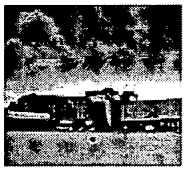
General content

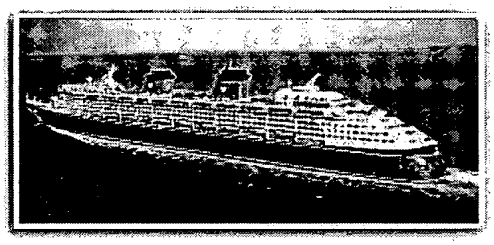
New Masterpact, *new levels of performance*


PB100723-27

Five performance levels

N1 - for standard applications with low short-circuit levels.
H1 - for industrial sites with high short-circuit levels or installations with two parallel-connected transformers.
H2 - high-performance for heavy industry where very high short-circuits can occur.
H3 - for incoming devices supplying critical applications requiring both high performance and a high level of discrimination.
L1 - for high current-limiting capability and a discrimination level (37 kA) as yet unequalled by any other circuit breaker of its type; intended for the protection of cable-type feeders or to raise the performance level of a switchboard when the transformer power rating is increased.


PB100722-24


PB100735-68

Integration in a communications network

Masterpact can be integrated in a general supervision system to optimise installation operation and maintenance. The communication architecture is open, and may be upgraded for interfacing with any protocol.

Switch-disconnector versions

The switch-disconnectors are derived directly from the circuit breakers and offer the same features and performance levels. They are available in HA, NA and HF versions, depending on the models. The HF version includes instantaneous protection to prevent closing on a short-circuit. Once closed, the switch-disconnectors are unprotected and behave like ordinary switches. They are often used for busbar coupling.

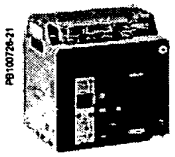
Special applications

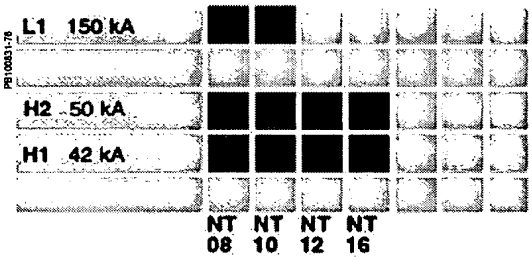
■ 1000 V AC:
□ Masterpact NW H10 circuit breakers and switch-disconnectors, 800 to 4000 A, 3P or 4P, drawout version and H10 circuit breaker performance level
■ DC:
□ Masterpact NW DC circuit breakers and switch-disconnectors, 1000 to 4000 A, fixed and drawout versions and N and H circuit breaker performance levels (see special DC catalogue no. ART10886)
■ right-hand neutral:
□ Masterpact NT630 to 1600 A and NW800 to 6300 A circuit breakers and switch-disconnectors, 4P, fixed and drawout versions and H1 and H2 circuit breaker performance levels
■ industrial environments with high concentrations of sulphur compounds (standard IEC 721-3-3):
□ Masterpact NW800 to 4000 A circuit breakers with corrosion protection, drawout version and H2 circuit breaker performance level
■ installation earthing:
□ Masterpact NW earthing switch, compatible with NW800 to 4000 A, 3P or 4P, drawout version with N1, H1, NA and HA performance levels.

3 frame sizes, 2 families

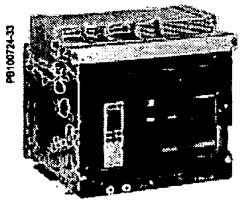
The new range of power circuit breakers includes two families:
- Masterpact NT, the world's smallest true power circuit breaker, with ratings from 800 to 1600 A
- Masterpact NW, in two frame sizes, one from 800 to 4000 A and the other from 4000 A to 6300 A.

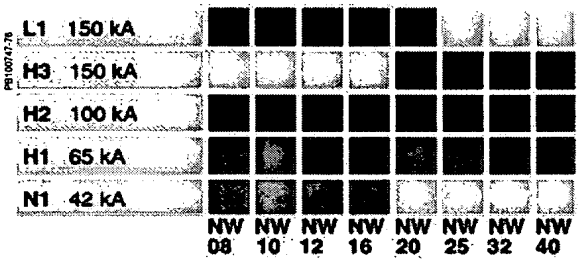
Masterpact NT
800 to 1600 A



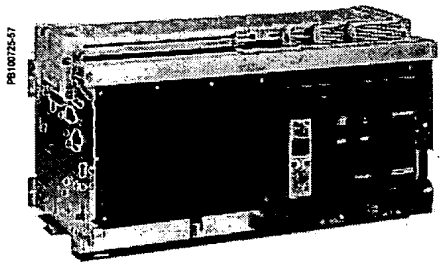


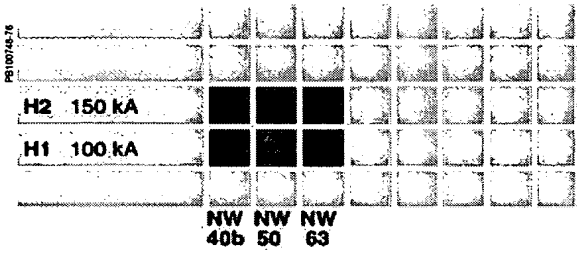
Masterpact NW
800 to 4000 A



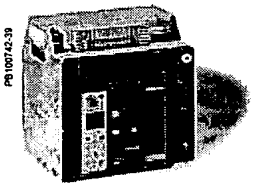


4000 to 6300 A



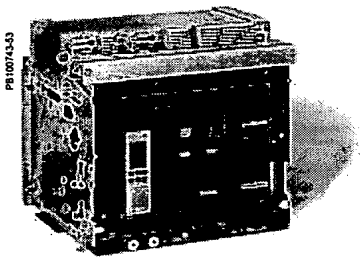


Optimised volumes



The smallest circuit breaker in the world

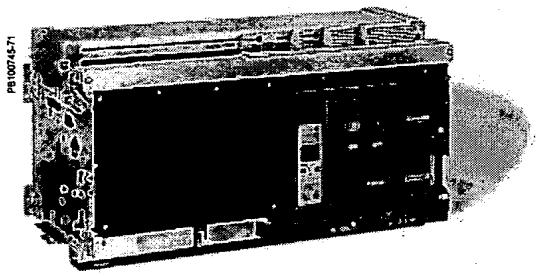
Masterpact NT innovates by offering all the performance of a power circuit breaker in an extremely small volume. The 70 mm pole pitch means a three-pole drawout circuit breaker can be installed in a switchboard section 400 mm wide and 400 mm deep.



Practical installation solutions

The new range improves upon all the installation solutions which have already made Masterpact a success. It has been designed to standardise switchboards, optimise volumes and simplify installation:

- ■ incoming connection to top or bottom terminals
- ■ no safety clearance required
- ■ connection:
  - □ horizontal or vertical rear connection
  - □ front connection with minimum extra space
  - □ mixed front and rear connections
- ■ 115 mm pole pitch on all versions
- ■ no derating up to 55 °C and 4000 A.



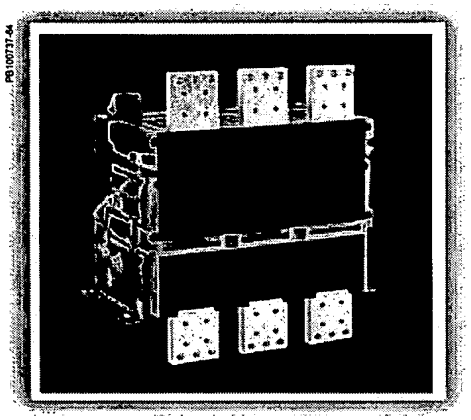
Optimised volumes

Up to 4000 A, Masterpact NW circuit breakers are all the same size, the same as the old M08 to 32 range.
From 4000 A to 6300 A, there is just one size, much smaller than before.

Retrofit solutions

Special connections are available to replace a fixed or drawout Masterpact M08 to 32 with a Masterpact NW, without modifying the busbars or the door cut-out.

Ease of installation

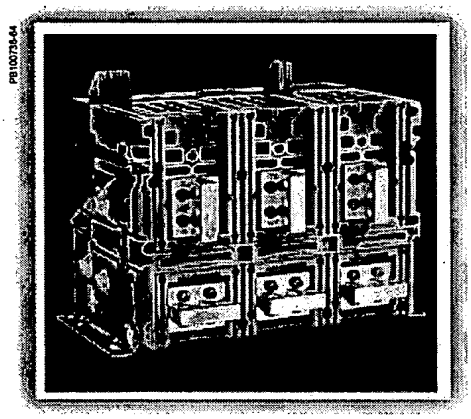


Vertical front connection of a fixed Masterpact NW.

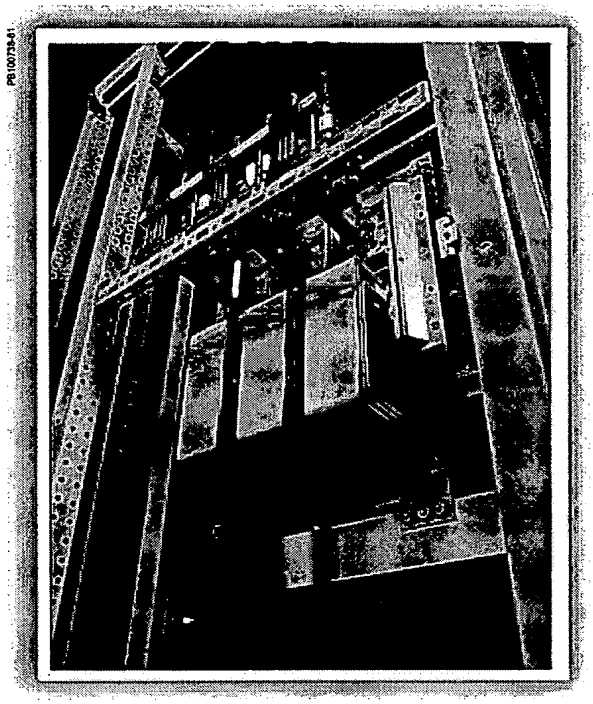
With optimised sizes, the Masterpact NT and NW ranges simplify the design of switchboards and standardise the installation of devices:

- a single connection layout for Masterpact NT
- three connection layouts for Masterpact NW:
  - one from 800 to 3200 A
  - one for 4000 A
  - one up to 6300 A
- identical connection terminals from 800 to 6300 A (Masterpact NW)
- front connection requires little space because the connectors to not increase the depth of the device

rear connection to vertical or horizontal busbars simply by turning the connectors 90°.



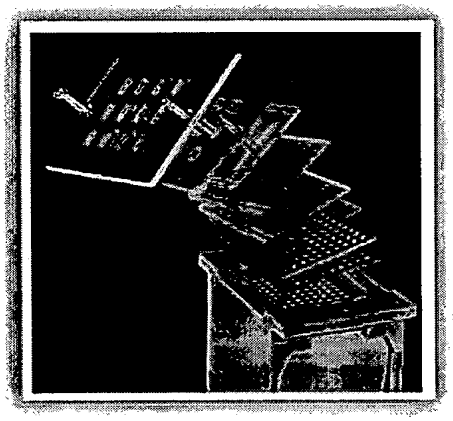
Vertical and horizontal rear connection of a fixed Masterpact NW.



Connection to busbars.

Innovation

PB100740



Filtered breaking.

Greater dependability...

Filtered breaking

patented

The patented new design of the arc chutes includes stainless-steel filters. The chutes absorb the energy released during breaking, thus limiting the stresses exerted on the installation. They filter and cool the gases produced, reducing effects perceptible from the outside.

Automatic unlatching

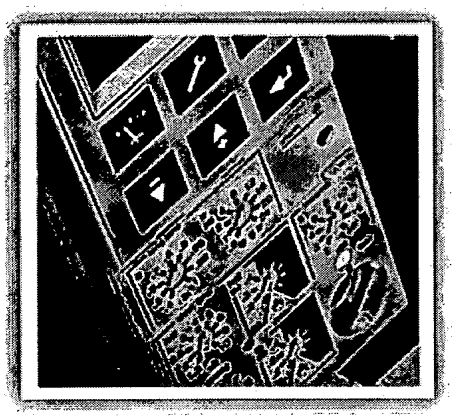
patented

The automatic unlatching of the circuit breaker operating mechanism for high short-circuits extends performance up to 150 kA. It produces ultra-fast tripping for all short-circuits higher than 37 kA (L1) and 65 kA (H3). For lower short-circuits, the system does not react so that the control unit can provide total discrimination with downstream devices.

More intelligent trip units...

Today, with the high speed of calculation, the small size of memories and advances in miniaturisation, trip units have become circuit breaker control units offering increasingly powerful functions. They accurately measure system parameters, instantly calculate values, store data, log events, signal alarms, communicate, take action, etc. The new Masterpact ranges, equipped with Micrologic control units, constitute both an extremely reliable protective device and an accurate measurement instrument.

PB100739



Navigation buttons on a Micrologic P control unit.

User friendly...

Intuitive use...

Micrologic control units are equipped with a digital LCD display used in conjunction with simple navigation buttons. Users can directly access parameters and settings. Navigation between screens is intuitive and the immediate display of values greatly simplifies settings. Text is displayed in the desired language.

... backed by incomparable security

patented

Protection functions are separate from the measurement functions and are managed by an ASIC electronic component. This independence guarantees immunity from conducted or radiated disturbances and ensures a high degree of reliability.
A patented "double setting" system for protection functions establishes:
- a maximum threshold set using the control-unit dials
- fine adjustments via the keypad or remotely. The fine adjustments for thresholds (to within one ampere) and tripping delays (to within a fraction of a second) are displayed directly on the screen.

The control unit cover can be lead-sealed to prevent uncontrolled access to the dials and protect the settings.

Ready for the future

Compliance with environmental requirements

Schneider Electric fully takes into account environmental requirements, starting right from the design phase of every product through to the end of its service life:
- the materials used for Masterpact are not potentially dangerous to the environment
- the production facilities are non-polluting in compliance with the ISO 14001 standard
- filtered breaking eliminates pollution in the switchboard
- the energy dissipated per pole is low, making energy losses insignificant
- the materials are marked to facilitate sorting for recycling at the end of product service life.

Simple upgrading of installations

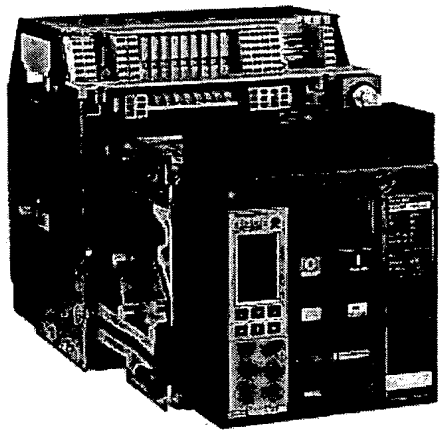
Installations change, power levels increase, new equipment is required and switchboards must be extended. Masterpact is designed to adapt to these changes:
- all control units are interchangeable
- communication with a supervision system is an option that may be added at any time
- a reserve chassis can be pre-addressed so that system parameters do not have to be modified when a drawout device is installed at a later date
- any future changes to the products will be designed to ensure continuity with the current ranges, thus simplifying installation upgrades.

Functions and characteristics

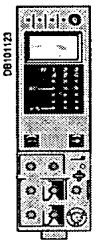
General overview
Detailed contents

This chapter describes all the functions offered by Masterpact NT and NW devices. The two product families have identical functions implemented using the same or different components depending on the case.

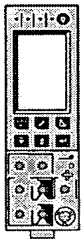
PB100762-60



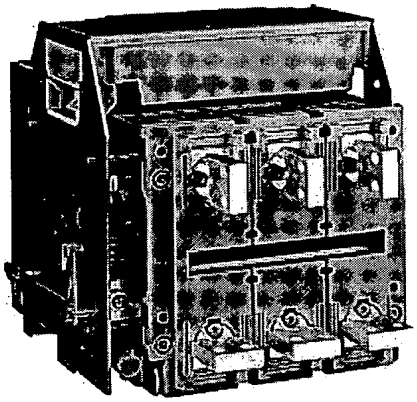
DB101123



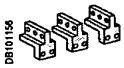
DB101124



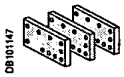
PB100763-56



DB101156

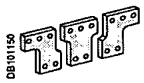


DB101147

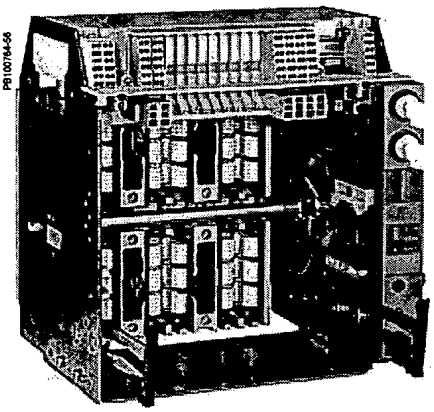


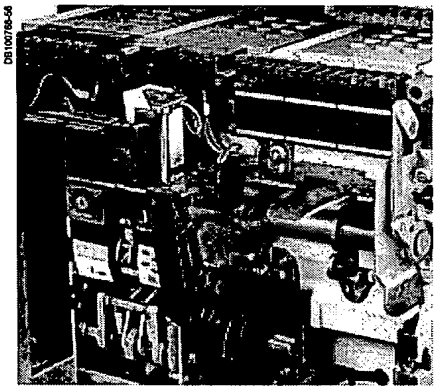
DB101149

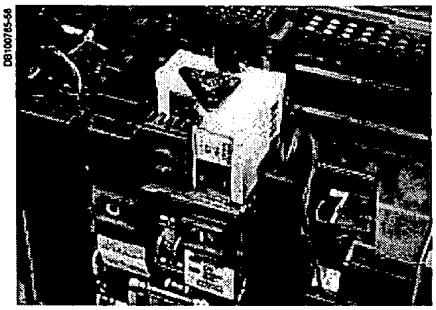
DB101150



General overview
Detailed contents







NT and NW selection criteria

	Masterpact NT				Masterpact NW	
	Standard applications			Special applications	Standard applications	
	NT630-1600 H1	NT630-1600 H2	NT630-1000 L1	NT630-1600 H10	NW800-1600 N1	NW800-4000 H1
Type of application	Standard applications with low short-circuit currents	Applications with medium-level short-circuit currents	Limiting circuit breaker for protection of cable-type feeders or upgraded transformer ratings	1000 V systems, e.g. mines and wind power	Standard applications with low short-circuit currents	Circuit breaker for industrial sites with high short-circuit currents
Icu/Ics at 440 V	42 kA	50 kA	130 kA	-	42 kA	65 kA
Icu/Ics at 1000 V	-	-	-	20 kA	-	-
Icu/Ics at 500 V DC L/R < 15 ms	-	-	-	-	-	-
Position of neutral	Left	Left	Left	Left	Left	Left or right
Fixed	F	F	F	F	F	F
Drawout	D	D	D	D	D	D
Switch-disconnector version	Yes	No	No	Yes	Yes	Yes
Front connection	Yes	Yes	Yes	Yes	Yes	Yes up to 3200 A
Rear connection	Yes	Yes	Yes	Yes	Yes	Yes
Type of Micrologic control unit	A, P, H	A, P, H	A, P, H	A, consult us for P and H	A, P, H	A, P, H

Masterpact NT06 to NT16 installation characteristics

Circuit breaker		NT06, NT08, NT10				NT12, NT16		
Type		H1	H2	L1	H10	H1	H2	H10
Connection								
Drawout	FC	■	■	■	■	■	■	■
	RC	■	■	■	■	■	■	■
Fixed	FC	■	■	■	■	■	■	■
	RC	■	■	■	■	■	■	■
Dimensions (mm) H x W x D								
Drawout	3P	322 x 288 x 277						
	4P	322 x 358 x 277						
Fixed	3P	301 x 276 x 196						
	4P	301 x 346 x 196						
Weight (kg) (approximate)								
Drawout	3P/4P	30/39						
Fixed	3P/4P	14/18						

Masterpact NW08 to NW63 installation characteristics

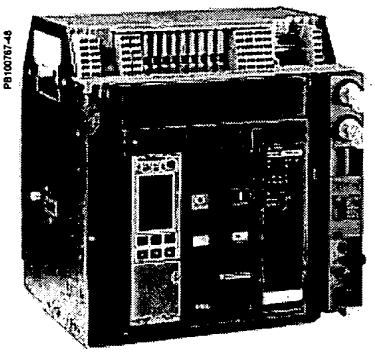
Circuit breaker		NW08, NW10, NW12, NW16					NW20				
Type		N1	H1	H2	L1	H10	H1	H2	H3	L1	H10
Connection											
Drawout	FC	■	■	■	■	-	■	■	■	■	-
	RC	■	■	■	■	■	■	■	■	■	■
Fixed	FC	■	■	■	-	-	■	■	-	-	-
	RC	■	■	■	-	-	■	■	-	-	-
Dimensions (mm) H x W x D											
Drawout	3P	439 x 441 x 395									
	4P	439 x 556 x 395									
Fixed	3P	352 x 442 x 297									
	4P	352 x 537 x 297									
Weight (kg) (approximate)											
Drawout	3P/4P	90/120									
Fixed	3P/4P	60/80									

(1) Except 4000 A.

				Special applications				
	NW800-4000 H2	**NW2000-4000 H3**	**NW800-2000 L1**	**NW H10**	**NW H2 with anti-corrosion protection**	**NW1000-4000 DC N**	**NW1000-4000 DC H**	**NW earthing switch**
	High-performance circuit breaker for heavy industry with high short-circuit currents	Incoming device with very high performance for critical applications	Limiting circuit breaker for protection of cable-type feeders or upgraded transformer ratings	1000 V systems, e.g. mines and wind power	Environments with high sulphur contents	DC system	DC system	Installation earthing
	100 kA	150 kA	150 kA	-	100 kA	-	-	-
	-	-	-	50 kA	-	-	-	-
	-	-	-	-	-	35 kA	85 kA	-
	Left or right	Left	Left	Left	Left or right	-	-	-
	F	-	-	-	-	F	F	-
	D	D	D	D	D	D	D	D
	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Yes up to 3200 A	Yes up to 3200 A	Yes up to 3200 A	No	Yes up to 3200 A	No	No	Yes up to 3200 A
	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	A, P, H	A, P, H	A, P, H	A, consult us for P and H	A, P, H	DC Micrologic	DC Micrologic	-

	NW25, NW32, NW40				NW40b, NW50, NW63	
	H1	H2	H3	H10	H1	H2
	■ (1)	■ (1)	■ (1)	-	-	-
	■	■	■	■	■	■
	■ (1)	■ (1)	-	-	-	-
	■	■	-	-	■	■
					479 x 786 x 395	
					479 x 1016 x 395	
					352 x 767 x 297	
					352 x 997 x 297	
					225/300	
					120/160	

Circuit breakers and switch-disconnectors
NT06 to NT16



Common characteristics		
Number of poles		3/4
Rated insulation voltage (V)	**Ui**	1000
Impulse withstand voltage (kV)	**Uimp**	12
Rated operational voltage (V AC 50/60 Hz)	**Ue**	690/1000
Suitability for isolation	IEC 60947-2	⊣⊢
Degree of pollution	IEC 60664-1	3

Circuit-breaker characteristics as per IEC 60947-2		
Rated current (A)	**In**	at 40 °C/50 °C (1)
Rating of 4th pole (A)		
Sensor ratings (A)		
Type of circuit breaker		
Ultimate breaking capacity (kA rms)	**Icu**	220/415 V
V AC 50/60 Hz		440 V
		525 V
		690 V
		1000 V
Rated service breaking capacity (kA rms)	**Ics**	% Icu
Utilisation category		
Rated short-time withstand current (kA rms)	**Icw**	0.5 s
V AC 50/60 Hz		1 s
		3 s
Integrated instantaneous protection (kA peak ±10 %)		
Rated making capacity (kA peak)	**Icm**	220/415 V
V AC 50/60 Hz		440 V
		525 V
		690 V
		1000 V
Break time (ms) between tripping order and arc extinction		
Closing time (ms)		

Circuit-breaker characteristics as per NEMA AB1	
Breaking capacity (kA)	240 V
V AC 50/60 Hz	480 V
	600 V

Switch-disconnector characteristics as per IEC 60947-3 and Annex A		
Type of switch-disconnector		
Rated making capacity (kA peak)	**Icm**	220 V
AC23A/AC3 category V AC 50/60 Hz		440 V
		525/690 V
		1000 V
Rated short-time withstand current (kA rms)	**Icw**	0.5 s
AC23A/AC3 category V AC 50/60 Hz		1 s
		3 s
Ultimate breaking capacity Icu (kA rms) with an external protection relay Maximum time delay: 350 ms		690 V

Mechanical and electrical durability as per IEC 60947-2/3 at In/Ie			
Service life	Mechanical	with maintenance	
C/O cycles x 1000		without maintenance	
Type of circuit breaker		**In (A)**	
Rated current			
C/O cycles x 1000	Electrical	without maintenance	440 V (4)
IEC 60947-2			690 V
			1000 V
Type of circuit breaker or switch-disconnector		**Ie (A)**	
Rated operationnal current			**AC23A**
C/O cycles x 1000	Electrical	without maintenance	440 V (4)
IEC 60947-3			690V
Type of circuit breaker or switch-disconnector		**Ie (A)**	
Rated operationnal current			**AC3 (5)**
Motor power			380/415 V (kW)
			440 V (kW)
C/O cycles x 1000	Electrical	without maintenance	440 V (4)
IEC 60947-3 Annex M/IEC 60947-4-1			690 V

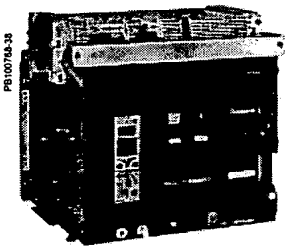
(1) 50 °C: rear vertical connected. Refer to temperature derating tables for other connection types.
(2) See the current-limiting curves in the "additional characteristics" section.
(3) SELLIM system.
(4) Available for 480 V NEMA.
(5) Suitable for motor control (direct-on-line starting).

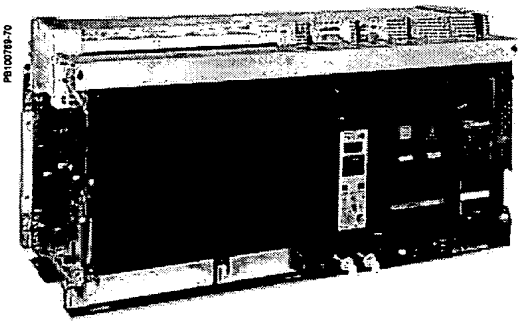
Sensor selection							
Sensor rating (A)	250 (1)	400	630	800	1000	1250	1600
Ir thresold setting(A)	100 to 250	160 to 400	250 to 630	320 to 800	400 to 1000	500 to 1250	640 to 1600

(1) For NT02 rating, please consult us.

NT06				NT08	NT10	NT12			NT16
630				800	1000	1250			1600
630				800	1000	1250			1600
400 to 630				400 to 800	400 to 1000	630 to 1250			800 to 1600
H1	H2	L1 (2)	H10			H1	H2	H10	
42	50	150	-			42	50	-	
42	50	130	-			42	50	-	
42	42	100	-			42	42	-	
42	42	25	-			42	42	-	
-	-	-	20			-	-	20	
100 %						100 %			
B	B	A	B			B	B	B	
42	36	10	20			42	36	20	
42	36	-	20			-	36	20	
24	20	-	-			24	20	-	
-	90	10 x In (3)	-			-	90	-	
88	105	330	-			88	105	-	
88	105	286	-			88	105	-	
88	88	220	-			88	88	-	
88	88	52	-			88	88	-	
-	-	-	42			-	-	42	
25	25	9	-			25	25	-	
< 50						< 50			
42	50	150	-			42	50	-	
42	50	100	-			42	50	-	
42	42	25	-			42	42	-	
HA	HA10					HA	HA10		
75	-					75	-		
75	-					75	-		
75	-					75	-		
-	42					-	42		
36	20					36	20		
36	20					36	20		
20	20					20	20		
36						36			
25									
12.5									
H1	H2	L1	H10	H1	H2	L1	H10	H1	H2	L1	H10	H1	H2	H10	H10	H1	H2
630				800				1000				1250			1600		
6	6	3	-	6	6	3	-	6	6	3	-	6	6	-	-	6	6
3	3	2	-	3	3	2	-	3	3	2	-	3	3	-	-	3	3
-	-	-	0.5	-	-	-	0.5	-	-	-	0.5	-	-	0.5	0.5	-	-
H1/H2/HA																	
630				800				1000				1250			1600		
6				6				6				6			6		
3				3				3				3			3		
H1/H2/HA																	
500				630				800				1000			1000		
≤ 250				250 to 335				335 to 450				450 to 560			450 to 560		
≤ 300				300 to 400				400 to 500				500 to 630			500 to 630		
6																	
-																	

Circuit breakers and switch-disconnectors NW08 to NW63





Common characteristics

Number of poles		3/4
Rated insulation voltage (V)	**Ui**	1000/1250
Impulse withstand voltage (kV)	**Uimp**	12
Rated operational voltage (V AC 50/60 Hz)	**Ue**	690/1150
Suitability for isolation	IEC 60947-2	—⨯|—
Degree of pollution	IEC 60664-1	4 (1000 V) / 3 (1250 V)

Circuit-breaker characteristics as per IEC 60947-2

Rated current (A)		at 40 °C / 50 °C [1]
Rating of 4th pole (A)		
Sensor ratings (A)		
Type of circuit breaker		
Ultimate breaking capacity (kA rms) V AC 50/60 Hz	**Icu**	220/415/440 V 525 V 690 V 1150 V
Rated service breaking capacity (kA rms)	**Ics**	% Icu
Utilisation category		
Rated short-time withstand current (kA rms) V AC 50/60 Hz	**Icw**	1 s 3 s
Integrated instantaneous protection (kA peak ±10 %)		
Rated making capacity (kA peak) V AC 50/60 Hz	**Icm**	220/415/440 V 525 V 690 V 1150 V
Break time (ms) between tripping order and arc extinction		
Closing time (ms)		

Circuit-breaker characteristics as per NEMA AB1

Breaking capacity (kA) V AC 50/60 Hz		240/480 V 600 V

Unprotected circuit-breaker characteristics:

Tripping by shunt trip as per IEC 60947-2

Type of circuit breaker		
Ultimate breaking capacity (kA rms) V AC 50/60 Hz	**Icu**	220...690 V
Rated service breaking capacity (kA rms)	**Ics**	% Icu
Rated short-time withstand current (kA rms)	**Icw**	1 s 3 s
Overload and short-circuit protection with external protection relay: short-circuit protection, maximum delay: 350 ms [4]		
Rated making capacity (kA peak) V AC 50/60 Hz	**Icm**	220...690 V

Switch-disconnector characteristics as per IEC 60947-3 and Annex A

Type of switch-disconnector		
Rated making capacity (kA peak) **AC23A/AC3 category** V AC 50/60 Hz	**Icm**	220...690 V 1150 V
Rated short-time withstand current (kA rms) **AC23A/AC3 category** V AC 50/60 Hz	**Icw**	0.5 s 1 s 3 s

Mechanical and electrical durability as per IEC 60947-2/3 at In/Ie

Service life	Mechanical	with maintenance	
C/O cycles x 1000		without maintenance	
Type of circuit breaker Rated current		**In (A)**	
C/O cycles x 1000 IEC 60947-2	Electrical	without maintenance	440 V [5] 690 V 1150 V
Type of circuit breaker or switch-disconnector Rated operational current		**Ie (A)**	**AC23A**
C/O cycles x 1000 IEC 60947-3	Electrical	without maintenance	440 V [5] 690 V
Type of circuit breaker or switch-disconnector Rated operational current		**Ie (A)**	**AC3 [6]**
Motor power			380/415 V (kW) 440 V [5] (kW) 690 V (kW)
C/O cycles x 1000 IEC 60947-3 Annex M/IEC 60947-4-1	Electrical	without maintenance	440/690 V [5]

(1) 50 °C: rear vertical connected. Refer to temperature derating tables for other connection types.
(2) See the current-limiting curves in the "additional characteristics" section.
(3) Equipped with a trip unit with a making current of 90 kA peak.
(4) External protection must comply with permissible thermal constraints of the circuit breaker (please consult us). No fault-trip indication by the SDE or the reset button.
(5) Available for 480 V NEMA.
(6) Suitable for motor control (direct-on-line starting).

Circuit breakers and switch-disconnectors
NW08 to NW63

Sensor selection													
Sensor rating (A)	250 (1)	400	630	800	1000	1250	1600	2000	2500	3200	4000	5000	6300
Ir thresold setting(A)	100 to 250	160 to 400	250 to 630	320 to 800	400 to 1000	500 to 1250	630 to 1600	800 to 2000	1000 to 2500	1250 to 3200	1600 to 4000	2000 to 5000	2500 to 6300

(1) For NW02 rating, please consult us.

	NW08	NW10	NW12	NW16		NW20					NW25	NW32	NW40		NW40b	NW50	NW63
	800	1000	1250	1600		2000					2500	3200	4000		4000	5000	6300
	800	1000	1250	1600		2000					2500	3200	4000		4000	5000	6300
	400 to 800	400 to 1000	630 to 1250	800 to 1600		1000 to 2000					1250 to 2500	1600 to 3200	2000 to 4000		2000 to 4000	2500 to 5000	3200 to 6300
	N1	H1	H2	L1 (2)	H10	H1	H2	H3	L1 (2)	H10	H1	H2	H3	H10	H1	H2	
	42	65	100	150	-	65	100	150	150	-	65	100	150	-	100	150	
	42	65	85	130	-	65	85	130	130	-	65	85	130	-	100	130	
	42	65	85	100	-	65	85	100	100	-	65	85	100	-	100	100	
	-	-	-	-	50	-	-	-	-	50	-	-	-	50	-	-	
	100 %					100 %					100 %				100 %		
	B					B					B				B		
	42	65	85	30	50	65	85	65	30	50	65	85	65	50	100	100	
	22	36	50	30	50	36	75	65	30	50	65	75	65	50	100	100	
	Without	Without	190	80	Without	Without	190	150	80	Without	Without	190	150	Without	Without	270	
	88	143	220	330	-	143	220	330	330	-	143	220	330	-	220	330	
	88	143	187	286	-	143	187	286	286	-	143	187	286	-	220	286	
	88	143	187	220	-	143	187	220	220	-	143	187	220	-	220	220	
	-	-	-	-	105	-	-	-	-	105	-	-	-	105	-	-	
	25	25	25	10	25	25	25	25	10	25	25	25	25	25	25	25	
	< 70					< 70					< 70				< 80		
	42	65	100	150	-	65	100	150	150	-	65	100	150	-	100	150	
	42	65	85	100	-	65	85	100	100	-	65	85	100	-	100	100	
		HA	HF (3)			HA	HF (3)				HA	HF (3)			HA		
		50	85			50	85				55	85			85		
		100 %				100 %					100 %				100 %		
		50	85			50	85				55	85			85		
		36	50			36	75				55	75			85		
		Without	Without			Without	Without				Without	Without			Without		
		105	187			105	187				121	187			187		

	NW08/NW10/NW12				NW16			NW20			NW25/NW32/NW40			NW40b/NW50/NW63	
	NA	HA	HF	HA10	HA	HF	HA10	HA	HF	HA10	HA	HF	HA10	HA	
	88	105	187	-	105	187	-	105	187	-	121	187	-	187	
	-	-	-	105	-	-	105	-	-	105	-	-	105	-	
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	42	50	85	50	50	85	50	50	85	50	55	85	50	85	
	-	36	50	50	50	50	50	50	50	50	55	75	50	85	
	25							20						10	
	12.5							10						5	
	N1/H1/H2	L1		H10				H1/H2	L1	H10	H1/H2	H3	H10	H1	H2
	800/1000/1250/1600							2000			2500/3200/4000			4000b/5000/6300	
	10	3		-				8	3	-	5	1.25	-	1.5	1.5
	10	3		-				6	3	-	2.5	1.25	-	1.5	1.5
	-	-		0.5				-	-	0.5	-	-	0.5	-	-
	H1/H2/NA/HA/HF							H1/H2/H3/HA/HF						H1/H2/HA	
	800/1000/1250/1600							2000			2500/3200/4000			4000b/5000/6300	
	10							8			5			1.5	
	10							6			2.5			1.5	
	H1/H2/HA/HF							H1/H2/H3/HA/HF							
	800	1000	1250		1600			2000							
	335 to 450	450 to 560	560 to 670		670 to 900			900 to 1150							
	400 to 500	500 to 630	500 to 800		800 to 1000			1000 to 1300							
	≤ 800	800 to 1000	1000 to 1250		1250 to 1600			1600 to 2000							
	6														

Micrologic control units
Overview of functions

All Masterpact circuit breakers are equipped with a Micrologic control unit that can be changed on site.
Control units are designed to protect Power circuits and loads. Alarms may be programmed for remote indications. Measurements of current, voltage, frequency, power and power quality optimise continuity of service and energy management.

Dependability

Integration of protection functions in an ASIC electronic component used in all Micrologic control units guarantees a high degree of reliability and immunity to conducted or radiated disturbances.
On Micrologic A, P and H control units, advanced functions are managed by an independent microprocessor.

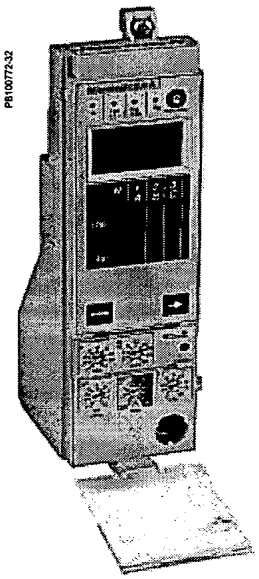
Micrologic name codes

2.0 A
X Y Z

X: type of protection
- 2 for basic protection
- 5 for selective protection
- 6 for selective + earth-fault protection
- 7 for selective + earth-leakage protection.

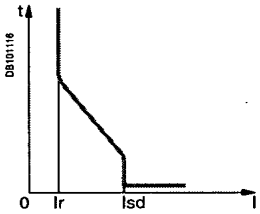
Y: control-unit generation
Identification of the control-unit generation.
"0" signifies the first generation.

Z: type of measurement
- A for "ammeter"
- P for "power meter"
- H for "harmonic meter".



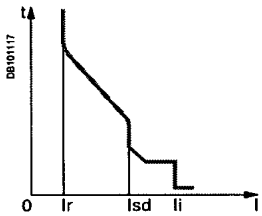
Current protection

Micrologic 2: basic protection



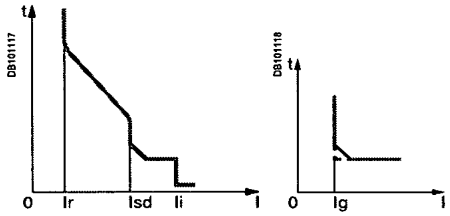
Protection:
long time
+ instantaneous

Micrologic 5: basic protection



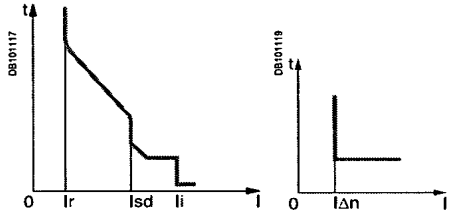
Protection:
long time
+ short time
+ instantaneous

Micrologic 6: selective + earth-fault protection



Protection:
long time
+ short time
+ instantaneous
+ earth fault

Micrologic 7: selective + earth-leakage protection



Protection:
long time
+ short time
+ instantaneous
+ earth leakage

Measurements and programmable protection

A: ammeter

- I_1, I_2, I_3, I_N, $I_{earth-fault}$, $I_{earth-leakage}$ and maximeter for these measurements
- fault indications
- settings in amperes and in seconds.

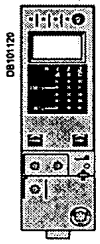
P: A + power meter + programmable protection

- measurements of V, A, W, VAR, VA, Wh, VARh, VAh, Hz, V_{peak}, A_{peak}, power factor and maximeters and minimeters
- IDMTL long-time protection, minimum and maximum voltage and frequency, voltage and current imbalance, phase sequence, reverse power
- load shedding and reconnection depending on power or current
- measurements of interrupted currents, differentiated fault indications, maintenance indications, event histories and time-stamping, etc.

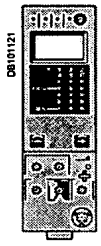
H: P + harmonics

- power quality: fundamentals, distortion, amplitude and phase of harmonics up to the 31st order
- waveform capture after fault, alarm or on request
- enhanced alarm programming: thresholds and actions.

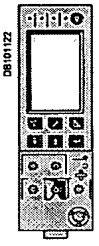
2.0 A



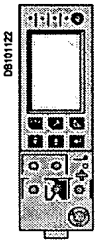
5.0 A



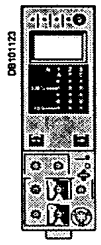
5.0 P



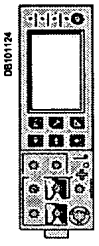
5.0 H



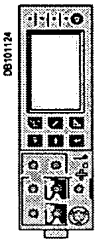
6.0 A



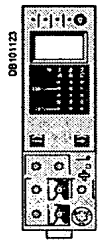
6.0 P



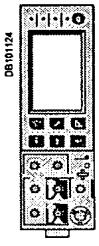
6.0 H



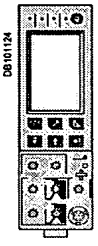
7.0 A



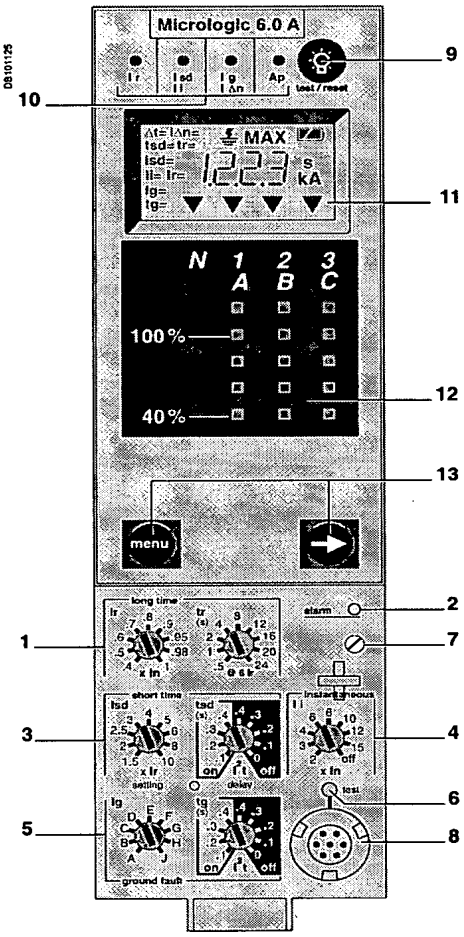
7.0 P



7.0 H



Micrologic A control units protect power circuits.
They also offer measurements, display, communication and current maximeters.
Version 6 provides earth-fault protection, version 7 provides earth-leakage protection.



1 *Long-time current setting and tripping delay.*
2 *Overload signal (LED) at 1.125 Ir.*
3 *Short-time pick-up and tripping delay.*
4 *Instantaneous pick-up.*
5 *Earth-leakage or earth-fault pick-up and tripping delay.*
6 *Earth-leakage or earth-fault test button.*
7 *Long-time rating plug screw.*
8 *Test connector.*
9 *Lamp test, reset and battery test.*
10 *Indication of tripping cause.*
11 *Digital display.*
12 *Three-phase bargraph and ammeter.*
13 *Navigation buttons.*

Protection settings

Protection thresholds and delays are set using the adjustment dials.
The selected values are momentarily displayed in amperes and in seconds.

Overload protection
True rms long-time protection.
Thermal memory: thermal image before and after tripping.
Setting accuracy may be enhanced by limiting the setting range using a different long-time rating plug.
The long-time rating plug "OFF" enables to cancel the overload protection.

Short-circuit protection
Short-time (rms) and instantaneous protection.
Selection of I^2t type (ON or OFF) for short-time delay.

Earth fault protection
Residual or source ground return.
Selection of I^2t type (ON or OFF) for delay.

Residual earth-leakage protection (Vigi).
Operation without an external power supply.
Protected against nuisance tripping.
DC-component withstand class A up to 10 A.

Neutral protection
On three-pole circuit breakers, neutral protection is not possible.
On four-pole circuit breakers, neutral protection may be set using a three-position switch: neutral unprotected (4P 3d), neutral protection at 0.5 In (4P 3d + N/2), neutral protection at In (4P 4d).

Zone selective interlocking (ZSI)
A ZSI terminal block may be used to interconnect a number of control units to provide total discrimination for short-time and earth-fault protection, without a delay before tripping.

"Ammeter" measurements

Micrologic A control units measure the true rms value of currents.
They provide continuous current measurements from 0.2 to 20 In and are accurate to within 1.5% (including the sensors).
A digital LCD screen continuously displays the most heavily loaded phase (Imax) or displays the I_1, I_2, I_3, I_N, I_g, $I_{\Delta n}$, stored-current (maximeter) and setting values by successively pressing the navigation button.
The optional external power supply makes it possible to display currents < 20 % In. Below 0.05 In, measurements are not significant. Between 0.05 and 0.2 In, accuracy is to within 0.5% In + 1.5% of the reading.

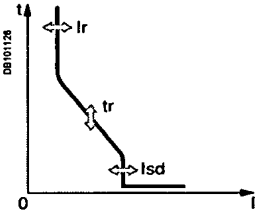
Communication option

In conjunction with the COM communication option, the control unit transmits the following:
- setting values
- all "ammeter" measurements
- tripping causes
- maximeter reset.

Note: *Micrologic A control units come with a transparent lead-seal cover as standard.*

Protection — Micrologic 2.0 A

Long time											
Current setting (A)	Ir = In x ...		0.4	0.5	0.6	0.7	0.8	0.9	0.95	0.98	1
Tripping between 1.05 and 1.20 x Ir			Other ranges or disable by changing long-time rating plug								
Time setting		tr (s)	0.5	1	2	4	8	12	16	20	24
Time delay (s)	Accuracy: 0 to -30 %	1.5 x Ir	12.5	25	50	100	200	300	400	500	600
	Accuracy: 0 to -20 %	6 x Ir	0.7(1)	1	2	4	8	12	16	20	24
	Accuracy: 0 to -20 %	7.2 x Ir	0.7(2)	0.69	1.38	2.7	5.5	8.3	11	13.8	16.6
Thermal memory			20 minutes before and after tripping								
(1) 0 to -40 % - (2) 0 to -60 %											
Instantaneous											
Pick-up (A)	Isd = Ir x ...		1.5	2	2.5	3	4	5	6	8	10
Accuracy: ±10 %											
Time delay			Max resettable time: 20 ms Max break time: 80 ms								

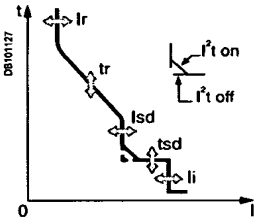


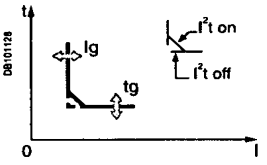
Ammeter — Micrologic 2.0 A

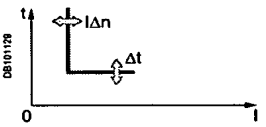
Continuous current measurements							
Display from 20 to 200 % of In			I1	I2	I3	IN	
Accuracy: 1.5 % (including sensors)			No auxiliary source (where I > 20 % In)				
Maximeters			I1 max	I2 max	I3 max	IN max	

Protection — Micrologic 5.0 / 6.0 / 7.0 A

Long time			Micrologic 5.0 / 6.0 / 7.0 A								
Current setting (A)	Ir = In x ...		0.4	0.5	0.6	0.7	0.8	0.9	0.95	0.98	1
Tripping between 1.05 and 1.20 x Ir			Other ranges or disable by changing long-time rating plug								
Time setting		tr (s)	0.5	1	2	4	8	12	16	20	24
Time delay (s)	Accuracy: 0 to -30 %	1.5 x Ir	12.5	25	50	100	200	300	400	500	600
	Accuracy: 0 to -20 %	6 x Ir	0.7(1)	1	2	4	8	12	16	20	24
	Accuracy: 0 to -20 %	7.2 x Ir	0.7(2)	0.69	1.38	2.7	5.5	8.3	11	13.8	16.6
Thermal memory			20 minutes before and after tripping								
(1) 0 to -40 % - (2) 0 to -60 %											
Short time											
Pick-up (A)	Isd = Ir x ...		1.5	2	2.5	3	4	5	6	8	10
Accuracy: ±10 %											
Time setting tsd (s)	Settings	I²t Off	0	0.1	0.2	0.3	0.4				
		I²t On	-	0.1	0.2	0.3	0.4				
Time delay (ms) at 10 x Ir	tsd (max resettable time)		20	80	140	230	350				
(I²t Off or I²t On)	tsd (max break time)		80	140	200	320	500				
Instantaneous											
Pick-up (A)	Ii = In x ...		2	3	4	6	8	10	12	15	off
Accuracy: ±10 %											
Time delay			Max resettable time: 20 ms Max break time: 80 ms								
Earth fault			Micrologic 6.0 A								
Pick-up (A)	Ig = In x ...		A	B	C	D	E	F	G	H	J
Accuracy: ±10 %	In ≤ 400 A		0.3	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
	400 A < In < 1250 A		0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
	In ≥ 1250 A		500	640	720	800	880	960	1040	1120	1200
Time setting tg (s)	Settings	I²t Off	0	0.1	0.2	0.3	0.4				
		I²t On	-	0.1	0.2	0.3	0.4				
Time delay (ms)	tg (max resettable time)		20	80	140	230	350				
at In or 1200 A (I²t Off or I²t On)	tg (max break time)		80	140	200	320	500				
Residual earth leakage (Vigi)			Micrologic 7.0 A								
Sensitivity (A)	IΔn		0.5	1	2	3	5	7	10	20	30
Accuracy: 0 to -20 %											
Time delay Δt (ms)	Settings		60	140	230	350	800				
	Δt (max resettable time)		60	140	230	350	800				
	Δt (max break time)		140	200	320	500	1000				





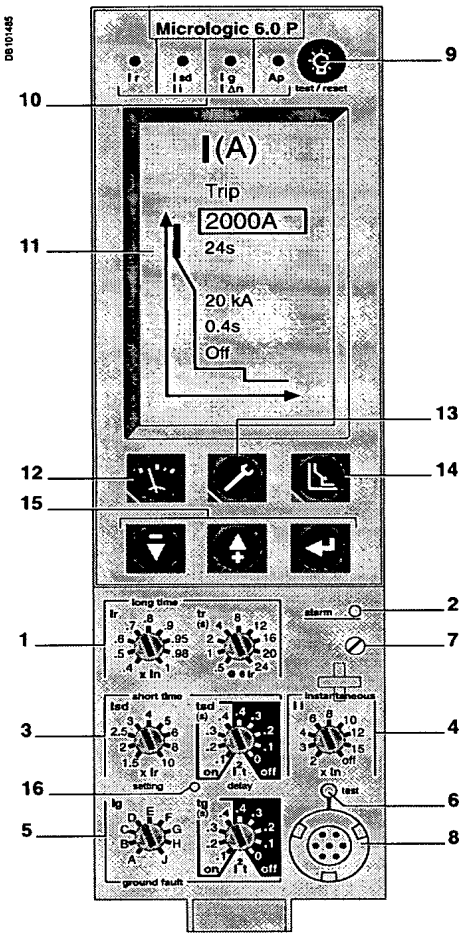


Ammeter — Micrologic 5.0 / 6.0 / 7.0 A

Continuous current measurements								
Display from 20 to 200 % of In		I1	I2	I3	IN	Ig	IΔn	
Accuracy: 1.5 % (including sensors)		No auxiliary source (where I > 20 % In)						
Maximeters		I1 max	I2 max	I3 max	IN max	Ig max	IΔn max	

***Note:** All current-based protection functions require no auxiliary source.*
The test / reset button resets maximeters, clears the tripping indication and tests the battery.

Micrologic P control units include all the functions offered by Micrologic A.
In addition, they measure voltages and calculate power and energy values.
They also offer new protection functions based on currents, voltages, frequency and power reinforce load protection.



1 *Long-time current setting and tripping delay.*
2 *Overload signal (LED).*
3 *Short-time pick-up and tripping delay.*
4 *Instantaneous pick-up.*
5 *Earth-leakage or earth-fault pick-up and tripping delay.*
6 *Earth-leakage or earth-fault test button.*
7 *Long-time rating plug screw.*
8 *Test connector.*
9 *Lamp + battery test and indications reset.*
10 *Indication of tripping cause.*
11 *High-resolution screen.*
12 *Measurement display.*
13 *Maintenance indicators.*
14 *Protection settings.*
15 *Navigation buttons.*
16 *Hole for settings lockout pin on cover.*

Note: *Micrologic P control units come with a non-transparent lead-seal cover as standard.*

Protection settings ..... +

The adjustable protection functions are identical to those of Micrologic A (overloads, short-circuits, earth-fault and earth-leakage protection).

Fine adjustment
Within the range determined by the adjustment dial, fine adjustment of thresholds (to within one ampere) and time delays (to within one second) is possible on the keypad or remotely using the COM option.

IDMTL (Inverse Definite Minimum Time lag) setting
Coordination with fuse-type or medium-voltage protection systems is optimised by adjusting the slope of the overload-protection curve. This setting also ensures better operation of this protection function with certain loads.

Neutral protection
On three-pole circuit breakers, neutral protection may be set using the keypad or remotely using the COM option, to one of four positions: neutral unprotected (4P 3d), neutral protection at 0.5 In (4P 3d + N/2), neutral protection at In (4P 4d) and neutral protection at 1,6 In (4P 3d + 1,6N). Neutral protection at 1,6 In is used when the neutral conductor is twice the size of the phase conductors (major load imbalance, high level of third order harmonics).
On four-pole circuit breakers, neutral protection may be set using a three-position switch or the keypad: neutral unprotected (4P 3d), neutral protection at 0.5 In (4P 3d + N/2), neutral protection at In (4P 4d). Neutral protection produces no effect if the long-time curve is set to one of the IDMTL protection settings.

Programmable alarms and other protection.....

Depending on the thresholds and time delays set using the keypad or remotely using the COM option, the Micrologic P control unit monitors currents and voltage, power, frequency and the phase sequence. Each threshold overrun is signalled remotely via the COM option. Each threshold overrun may be combined with tripping (protection) or an indication carried out by an optional M2C or M6C programmable contact (alarm), or both (protection and alarm).

Load shedding and reconnection.....

Load shedding and reconnection parameters may be set according to the power or the current flowing through the circuit breaker. Load shedding is carried out by a supervisor via the COM option or by an M2C or M6C programmable contact.

Measurements.....

The Micrologic P control unit calculates in real time all the electrical values (V, A, W, VAR, VA, Wh, VARh, VAh, Hz), power factors and crest factors.
The Micrologic P control unit also calculates demand current and demand power over an adjustable time period. Each measurement is associated with a minimeter and a maximeter.
In the event of tripping on a fault, the interrupted current is stored. The optional external power supply makes it possible to display the value with the circuit breaker open or not supplied.

Histories and maintenance indicators.....

The last ten trips and alarms are recorded in two separate history files. Maintenance indications (contact wear, operation cycles, etc.) are recorded for local access.

Indication option via programmable contacts

The M2C (two contacts) and M6C (six contacts) auxiliary contacts may be used to signal threshold overruns or status changes. They can be programmed using the keypad on the Micrologic P control unit or remotely using the COM option.

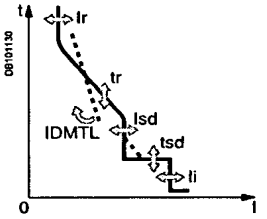
Communication option (COM)

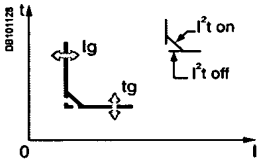
The communication option may be used to:
- remotely read and set parameters for the protection functions
- transmit all the calculated indicators and measurements
- signal the causes of tripping and alarms
- consult the history files and the maintenance-indicator register.
- maximeter reset.

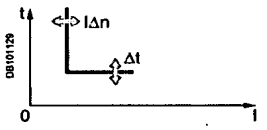
An event log and a maintenance register, stored in control-unit memory but not available locally, may be accessed in addition via the COM option.

Protection — Micrologic 5.0 / 6.0 / 7.0 P

Long time (rms)			**Micrologic 5.0 / 6.0 / 7.0 P**								
Current setting (A)	**Ir** = In x ...		0.4	0.5	0.6	0.7	0.8	0.9	0.95	0.98	1
Tripping between 1.05 and 1.20 x Ir			Other ranges or disable by changing long-time rating plug								
Time setting		**tr (s)**	0.5	1	2	4	8	12	16	20	24
Time delay (s)	Accuracy: 0 to -30 %	1.5 x Ir	12.5	25	50	100	200	300	400	500	600
	Accuracy: 0 to -20 %	6 x Ir	0.7(1)	1	2	4	8	12	16	20	24
	Accuracy: 0 to -20 %	7.2 x Ir	0.7(2)	0.69	1.38	2.7	5.5	8.3	11	13.8	16.6
IDMTL setting	Curve slope		SIT	VIT	EIT	HVFuse	DT				
Thermal memory			20 minutes before and after tripping								
(1) 0 to -40 % - (2) 0 to -60 %											
Short time (rms)											
Pick-up (A)	**Isd** = Ir x ...		1.5	2	2.5	3	4	5	6	8	10
Accuracy: ±10 %											
Time setting tsd (s)	Settings	I^2t Off	0	0.1	0.2	0.3	0.4				
		I^2t On	-	0.1	0.2	0.3	0.4				
Time delay (ms) at 10 Ir	**tsd** (max resettable time)		20	80	140	230	350				
(I^2t Off or I^2t On)	**tsd** (max break time)		80	140	200	320	500				
Instantaneous											
Pick-up (A)	**Ii** = In x ...		2	3	4	6	8	10	12	15	off
Accuracy: ±10 %											
Time delay			Max resettable time: 20 ms Max break time: 80 ms								
Earth fault			**Micrologic 6.0 P**								
Pick-up (A)	**Ig** = In x ...		A	B	C	D	E	F	G	H	J
Accuracy: ±10 %	In ⩽ 400 A		0.3	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
	400 A < In < 1250 A		0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
	In ⩾ 1250 A		500	640	720	800	880	960	1040	1120	1200
Time setting tg (s)	Settings	I^2t Off	0	0.1	0.2	0.3	0.4				
		I^2t On	-	0.1	0.2	0.3	0.4				
Time delay (ms)	**tg** (max resettable time)		20	80	140	230	350				
at In or 1200 A (I^2t Off or I^2t On)	**tg** (max break time)		80	140	200	320	500				
Residual earth leakage (Vigi)			**Micrologic 7.0 P**								
Sensitivity (A)	**IΔn**		0.5	1	2	3	5	7	10	20	30
Accuracy: 0 to -20 %											
Time delay Δt (ms)	Settings		60	140	230	350	800				
	Δt (max resettable time)		60	140	230	350	800				
	Δt (max break time)		140	200	320	500	1000				

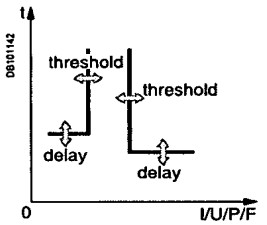






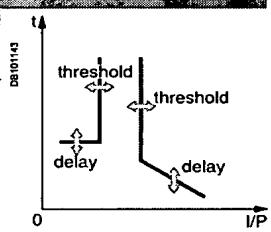
Alarms and other protection — Micrologic 5.0 / 6.0 / 7.0 P

Current		**Seuil**	**Temporisation**
Déséquilibre de courant	**Iunbalance**	0.05 to 0.6 Iaverage	1 to 40 s
Max. de courant moyen	**Imax demand** : I1, I2, I3, IN,	0.2 In to In	15 to 1500 s
Earth fault alarm			
	I↓	20 A to 1200 A	1 to 10 s
Voltage			
Voltage unbalance	**Uunbalance**	2 to 30 % x Uaverage	1 to 40 s
Minimum voltage	**Umin**	100 to Umax between phases	1.2 to 5 s
Maximum voltage	**Umax**	Umin to 1200 between phases	1.2 to 5 s
Power			
Reverse power	**rP**	5 to 500 kW	0.2 to 20 s
Frequency			
Minimum frequency	**Fmin**	45 to Fmax	1.2 to 5 s
Maximum frequency	**Fmax**	Fmin to 440 Hz	1.2 to 5 s
Phase sequence			
Sequense (alarm)	**ΔØ**	Ø1/2/3 or Ø1/3/2	0.3 s

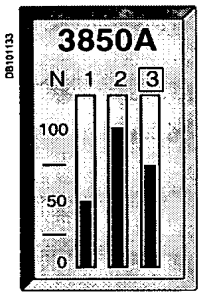


Load shedding and reconnection — Micrologic 5.0 / 6.0 / 7.0 P

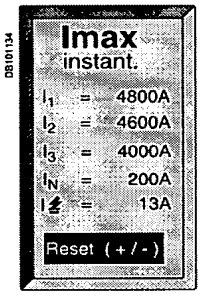
Measured value		**Seuil**	**Temporisation**
Current	**I**	0.5 to 1 Ir per phases	20 % tr to 80 % tr
Power	**P**	200 kW to 10 MW	10 to 3600 s



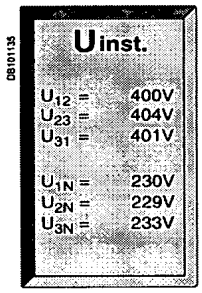
***Note:** all current-based protection functions require no auxiliary source.*
Voltage-based protection functions are connected to AC power via a voltage measurement input built into the circuit breaker.



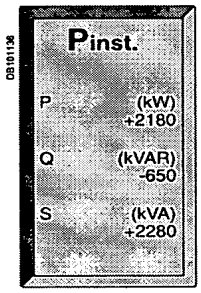
Default display.



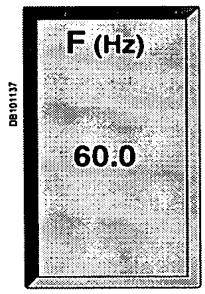
Display of a maximum current.



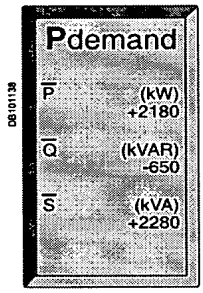
Display of a voltage.



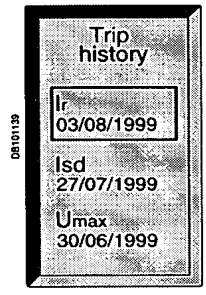
Display of a power.



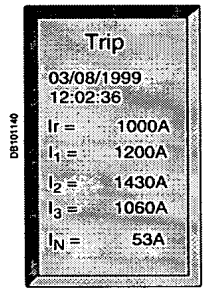
Display of a frequency.



Display of a demand power.



Display of a tripping history.



Display after tripping.

Navigation from one display to another is intuitive. The six buttons on the keypad provide access to the menus and easy selection of values. When the setting cover is closed, the keypad may no longer be used to access the protection settings, but still provides access to the displays for measurements, histories, indicators, etc.

Measurements

Instantaneous values

The value displayed on the screen is refreshed every second.
Minimum and maximum values of measurements are stored in memory (minimeters and maximeters).

Currents					
I rms	A	1	2	3	N
	A	E-fault		E-leakage	
I max rms	A	1	2	3	N
	A	E-fault		E-leakage	
Voltages					
U rms	V	12	23	31	
V rms	V	1N	2N	3N	
U average rms	V	(U12 + U23 + U31) / 3			
U unbalance	%				
Power, energy					
P active, Q reactive, S apparent	W, Var, VA	Totals			
E active, E reactive, E apparent	Wh, VARh, VAh	Totals consumed - supplied			
		Totals consumed			
		Totals supplied			
Power factor	PF	Total			
Frequencies					
F	Hz				

Demand metering

The demand is calculated over a fixed or sliding time window that may be programmed from 5 to 60 minutes. According to the contract signed with the power supplier, an indicator associated with a load shedding function makes it possible to avoid or minimise the costs of overrunning the subscribed power. Maximum demand values are systematically stored and time stamped (maximeter).

Currents					
I demand	A	1	2	3	N
	A	E-fault		E-leakage	
I max demand	A	1	2	3	N
	A	E-fault		E-leakage	
Power					
P, Q, S demand	W, Var, VA	Totals			
P, Q, S max demand	W, Var, VA	Totals			

Minimeters and maximeters

Only the current and power maximeters may be displayed on the screen.

Histories

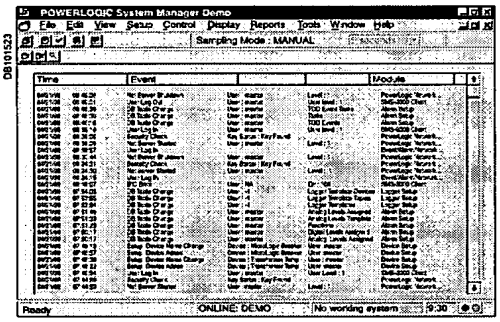
The last ten trips and alarms are recorded in two separate history files that may be displayed on the screen.

- ■ tripping history:
  - □ type of fault
  - □ date and time
  - □ values measured at the time of tripping (interrupted current, etc.)
- ■ alarm history:
  - □ type of alarm
  - □ date and time
  - □ values measured at the time of the alarm.

Maintenance indicators (with COM option)

A number of maintenance indicators may be called up on the screen:

- ■ contact wear
- ■ operation counter:
  - □ cumulative total
  - □ total since last reset.



DB101523

Display of an event log on a supervisor.

With the communication option

Additional measurements, maximeters and minimeters
Certain measured or calculated values are only accessible with the COM communication option:
- I peak / $\sqrt{2}$, (I1 + I2 + I3)/3, I unbalance
- load level in % Ir
- total power factor.

The maximeters and minimeters are available only via the COM option for use with a supervisor.

Event log
All events are time stamped.
- trips
- beginning and end of alarms
- modifications to settings and parameters
- counter resets
- system faults:
- fallback position
- thermal self-protection
- loss of time
- overrun of wear indicators
- test-kit connections
- etc.

Maintenance register
Used as an aid in troubleshooting and to better plan for device maintenance operations.
- highest current measured
- operation counter
- number of test-kit connections
- number of trips in operating mode and in test mode
- contact-wear indicator.

Additional technical characteristics

Setting the display language
System messages may be displayed in six different languages. The desired language is selected via the keypad.

Protection functions
All current-based protection functions require no auxiliary source. Voltage-based protection functions are connected to AC power via a voltage measurement input built into the circuit breaker.

Measurement functions
Measurement functions are independent of the protection functions.
The high-accuracy measurement module operates independently of the protection module, while remaining synchronised with protection events.

Measurement-calculation mode
- measurement functions implement the new "zero blind time" concept which consists in continuously measuring signals at a high sampling rate. The traditional "blind window" used to process samples no longer exists. This method ensures accurate energy calculations even for highly variable loads (welding machines, robots, etc.)
- energies are calculated on the basis of the instantaneous power values, in two manners:
  - the traditional mode where only positive (consumed) energies are considered
  - the signed mode where the positive (consumed) and negative (supplied) energies are considered separately.

Accuracy of measurements (including sensors)
- voltage (V) 0.5 %
- current (A) 1.5 %
- frequency (Hz) 0.1 %
- power (W) and energy (Wh) 2 %.

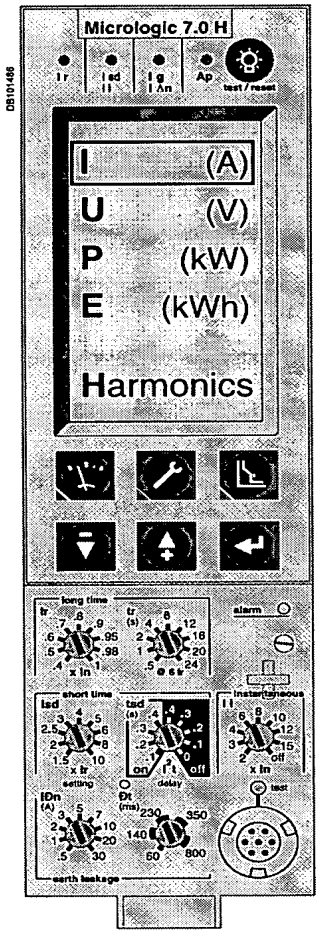
Stored information
The fine setting adjustments, the last 100 events and the maintenance register remain in the control-unit memory even when power is lost.

Time-stamping
Time-stamping is activated as soon as time is set manually or by a supervisor. No external power supply module is required (max. drift of 1 hour per year).

Reset
An individual reset, via the keypad or remotely, acts on alarms, minimum and maximum data, peak values, the counters and the indicators.

Micrologic control units
Micrologic H "harmonics"

Micrologic H control units include all the functions offered by Micrologic P. Integrating significantly enhanced calculation and memory functions, the Micrologic H control unit offers in-depth analysis of power quality and detailed event diagnostics. It is intended for operation with a supervisor.



In addition to the Micrologic P functions, the Micrologic H control unit offers:
- in-depth analysis of power quality including calculation of harmonics and the fundamentals
- diagnostics aid and event analysis through waveform capture
- enhanced alarm programming to analyse and track down a disturbance on the AC power system.

Measurements

The Micrologic H control unit offers all the measurements carried out by Micrologic P, with in addition:
- phase by phase measurements of:
  - power, energy
  - power factors
- calculation of:
  - current and voltage total harmonic distortion (THD)
  - current, voltage and power fundamentals
  - current and voltage harmonics up to the 31st order.

Instantaneous values displayed on the screen

Currents					
I rms	A	1	2	3	N
	A	E-fault		E-leakage	
I max rms	A	1	2	3	N
	A	E-fault		E-leakage	
Voltages					
U rms	V	12	23	31	
V rms	V	1N	2N	3N	
U average rms	V	(U12 + U23 + U31) / 3			
U unbalance	%				
Power, energy					
P active, Q reactive, S apparent	W, Var, VA	Totals	1	2	3
E active, E reactive, E apparent	Wh, VARh, VAh	Totals consumed - supplied			
		Totals consumed			
		Totals supplied			
Power factor	PF	Total	1	2	3
Frequencies					
F	Hz				
Power-quality indicators					
Total fundamentals		U I P Q S			
THD	%	U I			
U and Iharmonics	Amplitude	3 5 7 9 11 13			

Harmonics 3, 5, 7, 9, 11 and 13, monitored by electrical utilities, are displayed on the screen.

Demand measurements

Similar to the Micrologic P control unit, the demand values are calculated over a fixed or sliding time window that may be set from 5 to 60 minutes.

Currents					
I demand	A	1	2	3	N
	A	E-fault		E-leakage	
I max demand	A	1	2	3	N
	A	E-fault		E-leakage	
Power					
P, Q, S demand	W, Var, VA	Totals			
P, Q, S max demand	W, Var, VA	Totals			

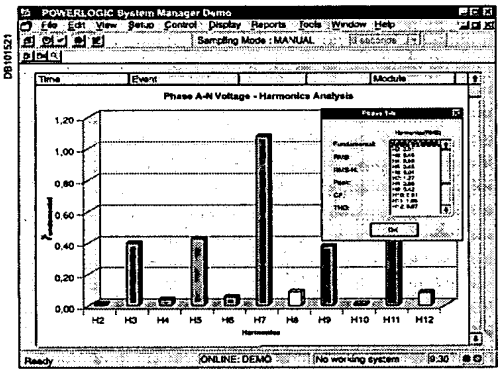
Maximeters

Only the current maximeters may be displayed on the screen.

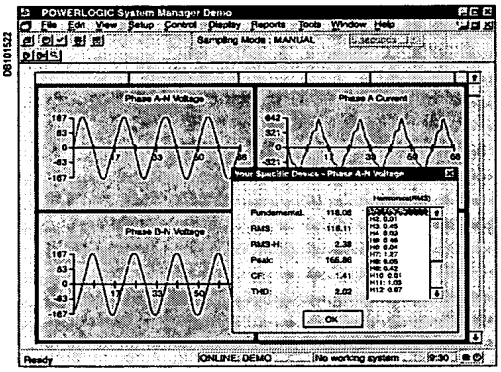
Histories and maintenance indicators

These functions are identical to those of the Micrologic P.

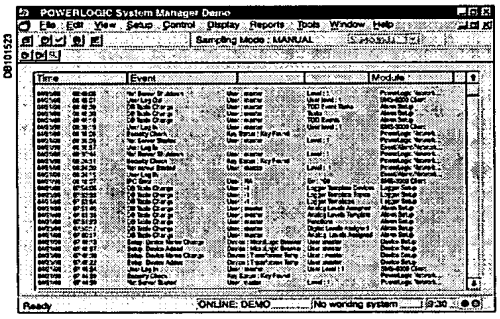
Note: *Micrologic H control units come with a non-transparent lead-seal cover as standard.*



Display of harmonics up to 21th order.



Waveform capture.



Log.

With the communication option

Additional measurements, maximeters and minimeters
Certain measured or calculated values are only accessible with the COM communication option:
- I peak / $\sqrt{2}$ $(I_1 + I_2 + I_3)/3$, $I_{unbalance}$
- load level in % Ir
- power factor (total and per phase)
- voltage and current THD
- K factors of currents and average K factor
- crest factors of currents and voltages
- all the fundamentals per phase
- fundamental current and voltage phase displacement
- distortion power and distortion factor phase by phase
- amplitude and displacement of current and voltage harmonics 3 to 31.

The maximeters and minimeters are available only via the COM option for use with a supervisor.

Waveform capture
The Micrologic H control unit stores the last 4 cycles of each instantaneous current or voltage measurement. On request or automatically on programmed events, the control unit stores the waveforms. The waveforms may be displayed in the form of oscillograms by a supervisor via the COM option. Definition is 64 points per cycle.

Pre-defined analogue alarms (1 to 53)
Each alarm can be compared to user-set high and low thresholds. Overrun of a threshold generates an alarm. An alarm or combinations of alarms can be linked to programmable action such as selective recording of measurements in a log, waveform capture, etc.

Event log and maintenance registers
The Micrologic H offers the same event log and maintenance register functions as the Micrologic P. In addition, it produces a log of the minimums and maximums for each "real-time" value.

Additional technical characteristics

Setting the display language
System messages may be displayed in six different languages. The desired language is selected via the keypad.
Protection functions
All current-based protection functions require no auxiliary source. Voltage-based protection functions are connected to AC power via a voltage measurement input built into the circuit breaker.

Measurement functions
Measurement functions are independent of the protection functions.
The high-accuracy measurement module operates independently of the protection module, while remaining synchronised with protection events.

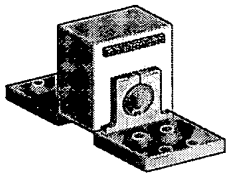
Measurement-calculation mode
An analogue calculation function dedicated to measurements enhances the accuracy of harmonic calculations and the power-quality indicators. The Micrologic H control unit calculates electrical magnitudes using 1.5 x In dynamics (20 x In for Micrologic P).
Measurement functions implement the new "zero blind time" concept
Energies are calculated on the basis of the instantaneous power values, in the traditional and signed modes.
Harmonic components are calculated using the discrete Fourier transform (DFT).

Accuracy of measurements (including sensors)
- voltage (V) 0.5 %
- current (A) 1.5 %
- frequency (Hz) 0.1 %
- power (W) and energy (Wh) 2 %
- total harmonic distortion 1 %

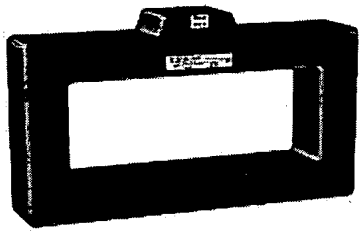
Stored information
The fine-setting adjustments, the last 100 events and the maintenance register remain in the control-unit memory even when power is lost.

Time-stamping
Time-stamping is activated as soon as time is set manually or by a supervisor no external power supply module is required (max. drift of 1 hour per year).

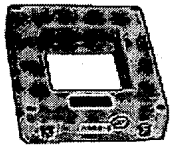
Reset
An individual reset, via the keypad or remotely, acts on alarms, minimum and maximum data, peak values, the counters and the indicators.



External sensor (CT).



Rectangular sensor.



External sensor for source ground return protection.

External sensors

External sensor for earth-fault and neutral protection
The sensors, used with the 3P circuit breakers, are installed on the neutral conductor for:
- neutral protection (with Micrologic P and H)
- residual type earth-fault protection (with Micrologic A, P and H)..

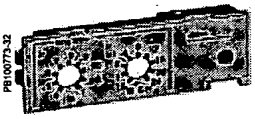
The rating of the sensor (CT) must be compatible with the rating of the circuit breaker:
- NT06 to NT16: TC 400/1600
- NW08 to NW20: TC 400/2000
- NW25 to NW40: TC 1000/4000
- NW40b to NW63: TC 2000/6300.

For oversized neutral protection the sensor rating must be compatible with the measurement range: 1.6 x IN (available up to NW 40 and NT 16).

Rectangular sensor for earth-leakage protection
The sensor is installed around the busbars (phases + neutral) to detect the zero-phase sequence current required for the earth-leakage protection. Rectangular sensors are available in two sizes.
Inside dimensions (mm)
- 280 x 115 up to 1600 A for Masterpact NT and NW
- 470 x 160 up to 4000 A for Masterpact NW.

External sensor for source ground return protection
The sensor is installed around the connection of the transformer neutral point to earth and connects to the Micrologic 6.0 control unit via an MDGF module to provide the source ground return (SGR) protection.

Voltage measurement inputs
Voltage measurement inputs are required for power measurements (Micrologic P or H) and for earth-leakage protection (Micrologic 7...).
As standard, the control unit is supplied by internal voltage measurement inputs placed downstream of the pole for voltages between 220 and 690 V AC. On request, it is possible to replace the internal voltage measurement inputs by an external voltage input (PTE option) which enables the control unit to draw power directly from the distribution system upstream of the circuit breaker. An 3 m cable with ferrite comes with this PTE option.

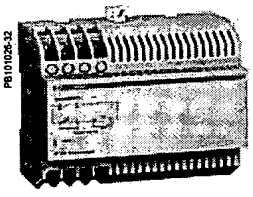


Long-time rating plug

Four interchangeable plugs may be used to limit the long-time threshold setting range for higher accuracy.
The time delay settings indicated on the plugs are for an overload of 6 Ir (for further details, see the characteristics on pages 25 and 27).
As standard, control units are equipped with the 0.4 to 1 plug.

Setting ranges										
Standard	Ir = In x...	0.4	0.5	0.6	0.7	0.8	0.9	0.95	0.98	1
Low-setting option	Ir = In x...	0.4	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.8
High-setting option	Ir = In x...	0.80	0.82	0.85	0.88	0.90	0.92	0.95	0.98	1
Off plug		No long-time protection (Ir = In for Isd setting)								

Important: *long-time rating plugs must always be removed before carrying out insulation or dielectric withstand tests.*

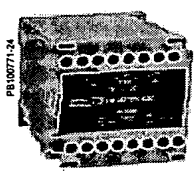


External 24 V DC power-supply module

The external power-supply module makes it possible to use the display even if the circuit breaker is open or not supplied (for the exact conditions of use, see the "electrical diagrams" part of this catalogue).
This module powers both the control unit (100 mA) and the M2C and M6C programmable contacts (100 mA).
With the Micrologic A control unit, this module makes it possible to display currents of less than 20 % of In.
With the Micrologic P and H, it can be used to display fault currents after tripping.

Characteristics
- power supply:
  - 110/130, 200/240, 380/415 V AC (+ 10 % - 15 %)
  - 24/30, 48/60, 100/125 V DC (+20 % -20 %)

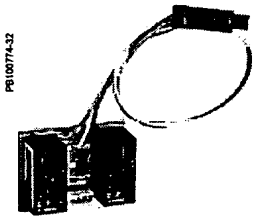
output voltage: 24 V DC ± 5%, 200 mA; towards the end of 2004, the available output current will be increased from 200 mA to 1 A
- ripple < 1 %
- dielectric withstand : 3.5 kV rms between input/output, for 1 minute
- overvoltage category: as per IEC 60947-1 cat. 4.



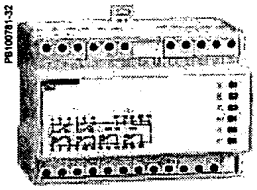
Battery module

The battery module makes it possible to use the display even if the power supply to the Micrologic control unit is interrupted and still commucating with the supervisor.

Characteristics
- battery run-time: 12 hours (approximately)
- mounted on vertical backplate or symmetrical rail.



M2C.



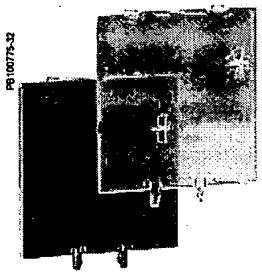
M6C.

M2C, M6C programmable contacts

These contacts are optional equipment for the Micrologic P and H control units. They are described with the indication contacts for the circuit breakers.

Characteristics			M2C/M6C
Minimum load			10 mA/24 V
Breaking capacity (A) p.f.: 0.7	V AC	240	5
		380	
	V DC	24	1.8
		48	1.5
		125	0.4
		250	0.15

M2C: 24 V DC power supplied by control unit (consumption 100 mA).
M6C: external 24 V DC power supply required (consumption 100 mA).



Lead-seal cover.

Spare parts

Lead-seal covers
A lead-seal cover controls access to the adjustment dials.
When the cover is closed:
- it is impossible to modify settings using the keypad unless the settings lockout pin on the cover is removed
- the test connector remains accessible
- the test button for the earth-fault and earth-leakage protection function remains accessible.

Characteristics
- transparent cover for basic Micrologic and Micrologic A control units
- non-transparent cover for Micrologic P and H control units.

Spare battery
A battery supplies power to the LEDs identifying the tripping causes. Battery service life is approximately ten years.
A test button on the front of the control unit is used to check the battery condition.
The battery may be replaced on site when discharged.

Portable test kit.

Test equipment

Hand-held test kit
The hand-held mini test kit may be used to:
- check operation of the control unit and the tripping and pole-opening system by sending a signal simulating a short-circuit
- supply power to the control units for settings via the keypad when the circuit-breaker is open (Micrologic P and H control units).

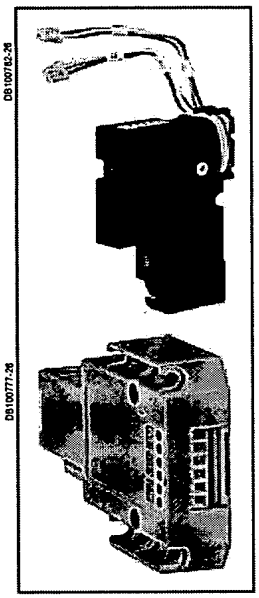
Power source: standard LR6-AA battery.

Full function test kit
The test kit can be used alone or with a supporting personal computer.
The test kit without PC may be used to check:
- the mechanical operation of the circuit breaker
- the electrical continuity of the connection between the circuit breaker and the control unit
- operation of the control unit:
  - display of settings
  - automatic and manual tests on protection functions
  - test on the zone-selective interlocking (ZSI) function
  - inhibition of the earth-fault protection
  - inhibition of the thermal memory.

The test kit with PC offers in addition:
- the test report (software available on request).

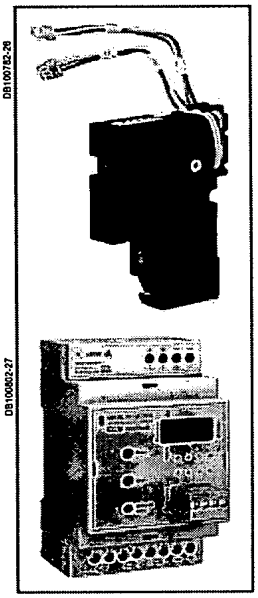
The COM option is required for integration of the circuit breaker or switch-disconnector in a supervision system.
Masterpact uses the Digipact or Modbus communications protocol for full compatibility with the SMS PowerLogic electrical-installation management systems.
An external gateway is available for communication on other networks:
- *Profibus*
- *Ethernet...*

Eco COM is limited to the transmission of metering data and does not allow the control of the circuit breaker.



Digipact "device" communication module.

Digipact "chassis" communication module.



Modbus "device" communication module.

Modbus "chassis" communication module.

For fixed devices, the COM option is made up of:
- a "device" communication module, installed behind the Micrologic control unit and supplied with its set of sensors (OF, SDE ,PF and CH micro-contacts) and its kit for connection to XF and MX1 communicating voltage releases.

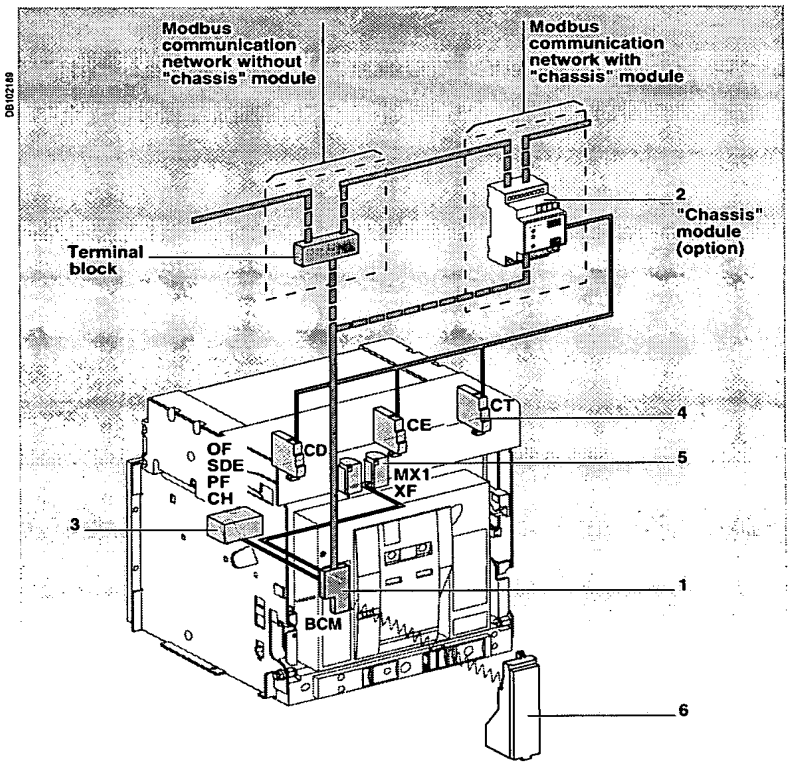
For drawout devices, the COM option is made up of:
- a "device" communication module, installed behind the Micrologic control unit and supplied with its set of sensors (OF, SDE, PF and CH micro-contacts) and its kit for connection to XF and MX1 communicating voltage releases
- a "chassis" communication module supplied separately with its set of sensors (CE, CD and CT contacts).

Status indication by the COM option is independent of the device indication contacts. These contacts remain available for conventional uses.

Digipact or Modbus "Device" communication module
This module is independent of the control unit. It receives and transmits information on the communication network. An infra-red link transmits data between the control unit and the communication module.
Consumption: 30 mA, 24 V.

Digipact or Modbus "chassis" communication module
This module is independent of the control unit. With Modbus "chassis" communication module, this module makes it possible to address the chassis and to maintain the address when the circuit breaker is in the disconnected position.
Consumption: 30 mA, 24 V.

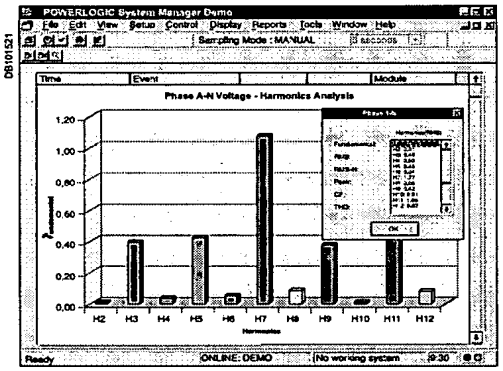
XF and MX1 communicating voltage releases
The XF and MX1 communicating voltage releases are equipped for connection to the "device" communication module.
The remote-tripping function (MX2 or MN) are independent of the communication option. They are not equipped for connection to the "device" communication module.



1 "Device" communication module.
2 "Chassis" communication module (option).
3 OF, SDE, PF and CH communicating "device" sensors.
4 CE, CD and CT communicating "chassis" sensors.
5 MX1 and XF communicating release.
6 Control unit.

: Hard wire.
: Communication bus.

Communication
Overview of functions



The Masterpact circuit breakers and switch-disconnectors are compatible with the Digipact or Modbus COM option.

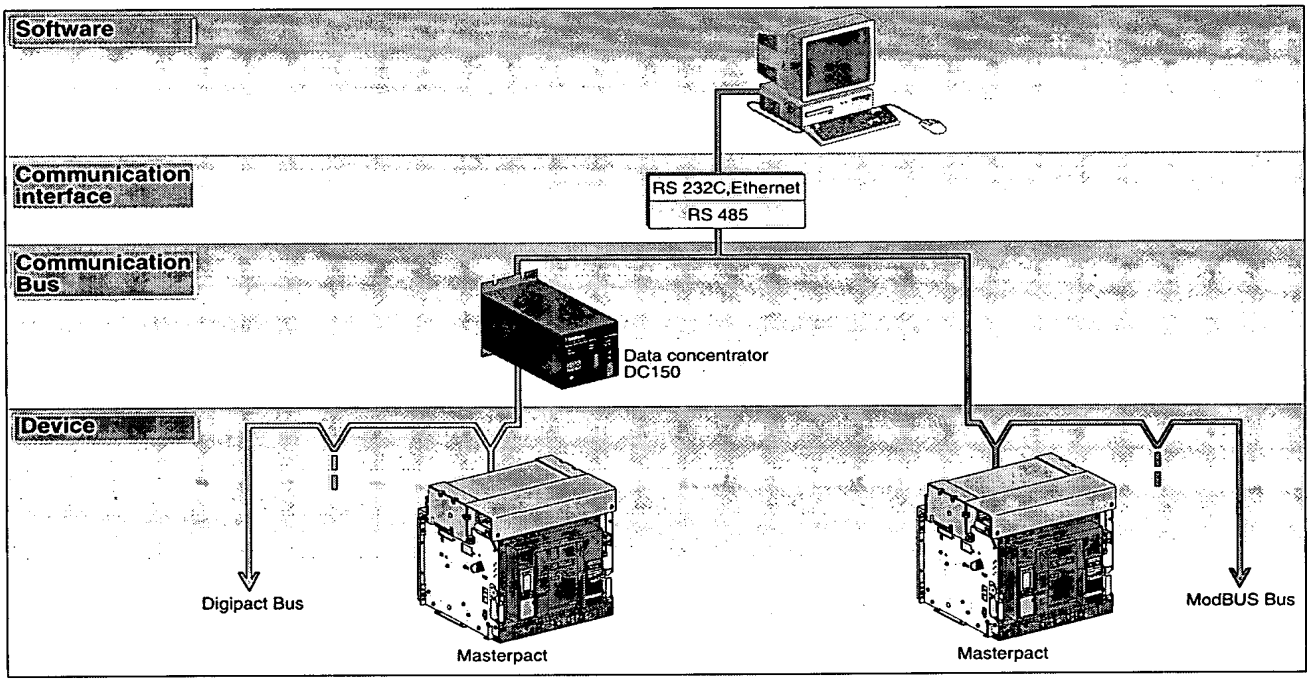
The COM option may be used to:
- identify the device
- indicate status conditions
- control the device.

Depending on the different types of Micrologic (A, P, H) control units, the COM option also offers:
- setting of the protection and alarms functions
- analysis of the AC-power parameters for operating-assistance and maintenance purposes.

	Switch-disconnector with communication bus		Circuit breaker with communication bus					
	Digipact	Modbus	Digipact			Modbus		
Device identification								
Address	■	■	A	P	H	A	P	H
Rating	-	-	A	P	H	A	P	H
Type of device	-	-					P	H
Type of control unit	-	-	A	P	H	A	P	H
Type of long-time rating plug	-	-	A	P	H	A	P	H
Signalisation d'états								
ON/OFF OF	■	■	A	P	H	A	P	H
Spring charged CH	■	■	A	P	H	A	P	H
Ready to close PF	■	■	A	P	H	A	P	H
Fault-trip SDE	-	-	A	P	H	A	P	H
Connected/disconnected/ test position CE/CD/CT	■	■	A	P	H	A	P	H
Controls								
ON/OFF MX/XF	■	■	A	P	H	A	P	H
Spring charging	-	-						
Reset of the mechanical indicator	-	-						
Protections and alarms settings								
Reading of protections settings			A	P	H	A	P	H
Writing of fine settings in the range imposed by the adjustment dials							P	H
Reading/writing of alarms (load shedding and reconnect, M2C, etc.)							P	H
Reading/writing of custom alarms								H
Operating and maintenance aids								
Measurement								
Current			A	P	H	A	P	H
Voltages, frequency, power, etc.				P	H		P	H
Power quality: fundamental, harmonics								H
Programming of demand metering							P	H
Fault readings								
Type of fault						A	P	H
Interrupted current							P	H
Waveform capture								
On faults								H
On demand or programmed								H
Histories and logs								
Trip history							P	H
Alarm history							P	H
Event logs							P	H
Indicators								
Counter operation			A	P	H	A	P	H
Contact wear							P	H
Maintenance register							P	H

***Note:** see the description of the Micrologic control units for further details on protection and alarms, measurements, waveform capture, histories, logs and maintenance indicators.*

Communication
Masterpact in a communication network



Devices

Circuit breakers equipped with Micrologic control units may be connected to either a Digipact or Modbus communication bus. The information made available depends on the type of Micrologic control unit (A, P or H) and on the type of communication bus (Digipact or Modbus).
Switch-disconnectors can be connected to the Digipact or Modbus communication bus. The information made available is the status of the switch-disconnector.

Communication bus

Digipact bus

The Digipact bus is the internal bus of the low-voltage switchboard in which the Digipact communicating devices are installed (Masterpact with Digipact COM, PM150, SC150, UA150, etc.). This bus must be equipped with a DC150 data concentrator (see the Powerlogic System catalogue).

Addresses
Addressing is carried out by the DC150 data concentrator.

Number of devices
The maximum number of devices that may be connected to the Digipact bus is calculated in terms of "communication points". These points correspond to the amount of traffic the bus can handle. The total number of points for the various devices connected to a single bus must not exceed 100.
If the required devices represent more than 100 points, add a second Digipact internal bus.

Communicating device	Number of points
DC150 data concentrator	4
Micrologic + Digipact COM	4
PM150	4
SC150	4
UA150	4

Length of bus
The maximum recommended length for the Digipact internal bus is 200 meters.

Bus power source
Power is supplied by the DC150 data concentrator (24 V).

Communication
Masterpact in a communication network

Modbus bus
The Modbus RS485 (RTU protocol) system is an open bus on which communicating Modbus devices (Masterpact with Modbus COM, PM300, Sepam, Vigilohm, etc.) are installed. All types of PLCs and microcomputers may be connected to the bus.

Addresses
The Modbus parameters (address, baud rate, parity) are entered using the keypad on the Micrologic A, P or H. For a switch-disconnector, it is necessary to use the RSU (Remote Setting Utility) Micrologic utility.
The software layer of the Modbus protocol can manage up to 255 addresses (1 to 255).
The "device" communication module comprises three addresses linked to:
- circuit-breaker manager
- measurement manager
- protection manager.

The "chassis" communication module comprises one address linked to:
- the chassis manager.

The division of the system into four managers secures data exchange with the supervision system and the circuit-breaker actuators.
The manager addresses are automatically derived from the circuit-breaker address @xx entered via the Micrologic control unit (the default address is 47).

Logic addresses		
@xx	Circuit-breaker manager	(1 to 47)
@xx + 50	Chassis manager	(51 to 97)
@xx + 200	Measurement managers	(201 to 247)
@xx + 100	Protection manager	(101 to 147)

Number of devices
The maximum number of devices that may be connected to the Modbus bus depends on the type of device (Masterpact with Modbus COM, PM500, Sepam, Vigilohm, etc.), the baud rate (19200 is recommended), the volume of data exchanged and the desired response time. The RS485 physical layer offers up to 32 connection points on the bus (1 master, 31 slaves).
A fixed device requires only one connection point (communication module on the device).
A drawout device uses two connection points (communication modules on the device and on the chassis).
The number must never exceed 31 fixed devices or 15 drawout devices.

Length of bus
The maximum recommended length for the Modbus bus is 1200 meters.

Bus power source
A 24 V DC power supply is required (less than 20 % ripple, insulation class II).

Communication interface
The Modbus bus may be connected to the central processing device in any of three manners:
- direct link to a PLC. The communication interface is not required if the PLC is equipped with a Modbus port
- direct link to a computer. The Modbus (RS485) / Serial port (RS232) communication interface is required
- connection to a TCP/IP (Ethernet) network. The Modbus (RS485) / TCP/IP (Ethernet) communication interface is required.

Software
To make use of the information provided by the communicating devices, software with a Modbus driver must be used.

Micrologic utilities
This is a set of software that may be used with a PC to:
- display the variables (I, U, P, E, etc.) with the RDU (Remote Display Utility)
- read/write the settings with the RSU (Remote Setting Utility)
- remotely control (ON / OFF) the device with the RCU (Remote Control Utility).

Micrologic utilities are available upon request

SMS (System Manager Software)
SMS is a software to monitor LV and/or MV electrical energy.
The SMS family includes a software range depending on the application and function, from single product monitoring to the management of a multiple building:
- Power Meter and Circuit Monitor units
- LV devices
- Sepam units.

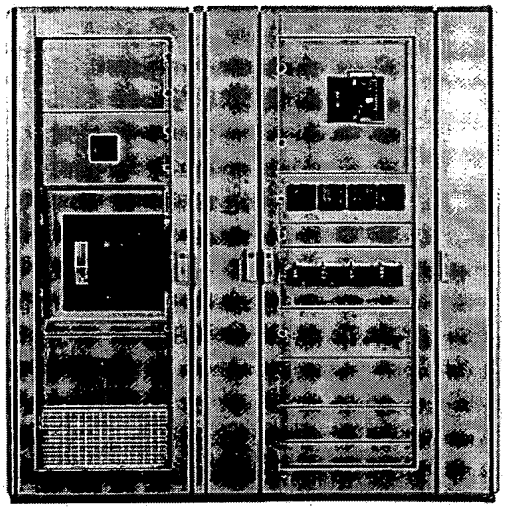
Communication
Masterpact and the MPS100 Micro Power Server

The MPS100 Micro Power Server:
- *notifies maintenance staff when any preset alarm or trip is activated by the Micrologic trip unit, automatically sending an e-mail and/or SMS*
- *data logs are periodically forwarded by e-mail*
- *the e-mails are sent via an Ethernet local area network (LAN) or remotely via modem.*

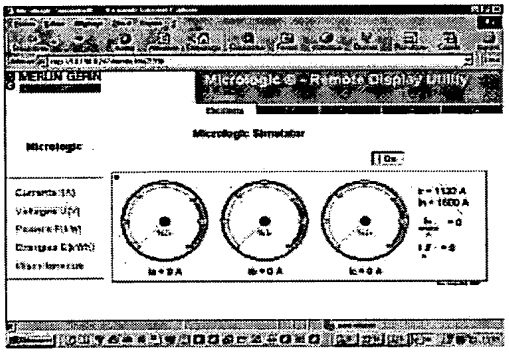
PB100823-42


PB100804-40

MPS100 Micro Power Server.


PB100789-48

Main LV switchboard.



PB100877-67

Monitoring of your main LV switchboard via embedded web pages in the MPS100 accessible with a standard web browser.

Micro Power Server makes data collection easy for monitoring Masterpact/Compact circuit breakers

Now, more than ever, there is a need to monitor electrical distribution systems in industrial and large commercial applications. The key to managing all equipment, maximising efficiencies, reducing costs and increasing up time is having the right tools.
Micro Power Server MPS100 is designed to withstand harsh electrical environments and provide a consistent flow of easy to interpret information.

Micro Power Server is designed for unattended operation within the main LV switchboard

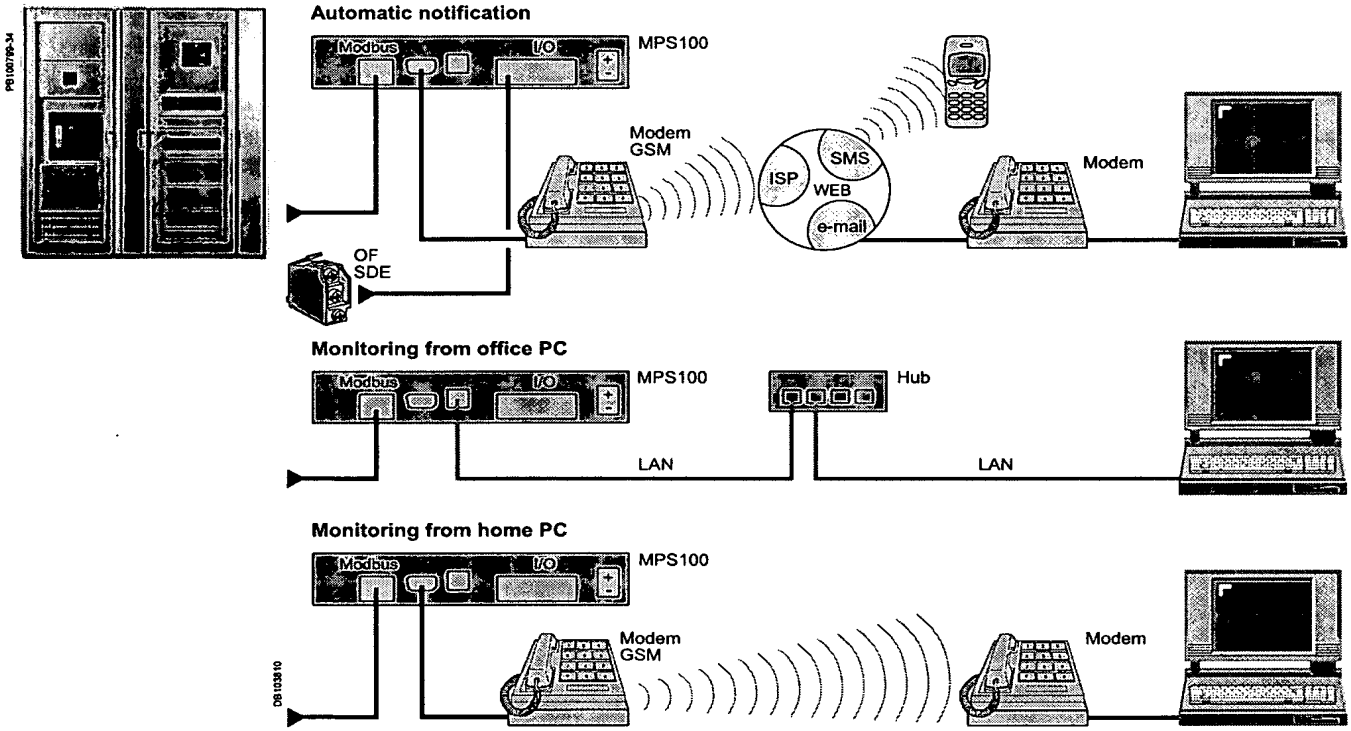
The MPS100 is a self-contained facility information server that serves as a stand-alone device for power system monitoring.
It is used to transfer power system information via a standard web browser over an Ethernet local area network (LAN) or via modem, making it possible to view power system information on a PC with an Ethernet connection.
In either capacity, the Micro Power Server functions as a web server for Micrologic trip unit and Power Meter (PM500) supervision, automatically notifying (e-mail and/or SMS) maintenance staff when any preset alarm or trip is activated in the Micrologic trip unit.

Benefits

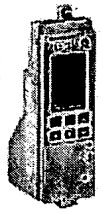
- view your main LV switchboard without installing software on your local PC, eliminating the need for a dedicated PC with specific software
- Micro Power Server allows centralised monitoring, so you no longer waste precious time walking around the facility to collect data
- view your main LV switchboard via a modem connection (GSM or switched network), avoiding the need for a LAN
- maintenance people are automatically notified at any time, wherever they are, so you do not have to stay in front of a monitor all day long
- data logs can be periodically forwarded by sending e-mails to the relevant people (maintenance, accounting, application service provider) automatically
- possibility to monitor/notify six external events (limit switches, auxiliary switches...)
- back-up of Micrologic trip unit settings in the memory of the MPS100, so you know where to retrieve it when necessary.

Communication
Masterpact and the MPS100 Micro Power Server

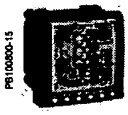
Typical architecture



It is possible to combine the different types of architecture.



Micrologic trip unit.



Power Meter PM500.

Short Message Service (SMS).

Supported Modbus devices

- Micrologic trip units
- Power Meters (PM500, PM700, PM800...).

Maximum recommended connected devices is 10.

Features

- access to the power system via a standard PC web browser
- real-time data displayed with an intuitive and user friendly interface (dashboard)
- Ethernet Modbus TCP/IP connectivity directly to the LAN or via modem (Point to Point Protocol services)
- SMTP (Simple Mail Transfer Protocol) client (capacity to send e-mail)
- local logging of data such as energy, power, current...
- set-up and system configuration through MPS100 embedded HTML pages
- user interface translatable in any language, factory settings in English and French
- 6 inputs/2 outputs (no-volt contact)
- DHCP (Dynamic Host Configuration Protocol) client.

Technical characteristics

Power supply	24 V DC ±15 %, consumption = 250 mA
Operating temperature	0 to +50 °C
Rugged compact metal housing	35 x 218 x 115 mm (H x W x D)

Additional information available at: http://194.2.245.4/mkt/microser.nsf
User name: MPS, Password: MPS100

Part numbers

MPS100 Micro Power Server	**33507**

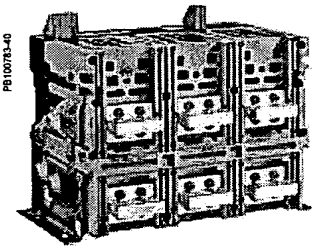
Connections
Overview of solutions

Three types of connection are available:
- *vertical or horizontal rear connection*
- *front connection*
- *mixed connection.*

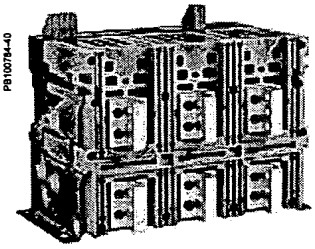
The solutions presented are similar in principle for all Masterpact NT and NW fixed and drawout devices.

Rear connection

Horizontal

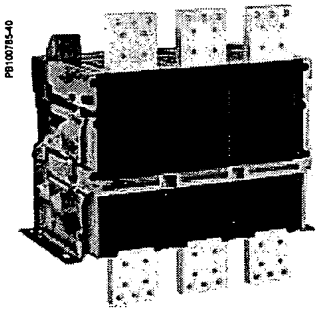


Vertical



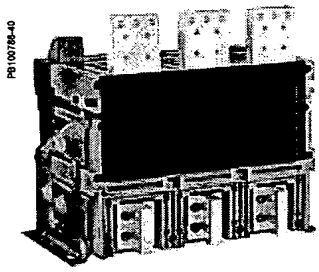
Simply turn a horizontal rear connector 90° to make it a vertical connector.
For the 6300 A circuit breaker, only vertical connection is available.

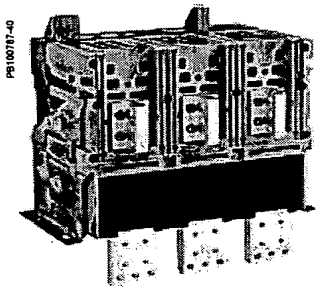
Front connection

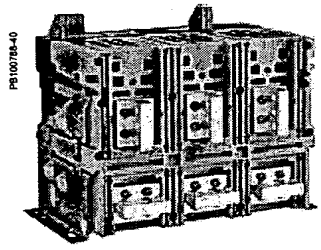


Front connection is available for NW fixed and drawout versions up to 3200 A.

Mixed connection

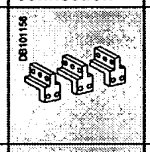
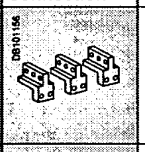
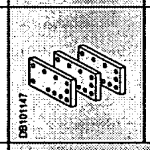
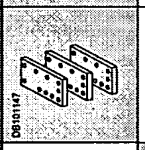
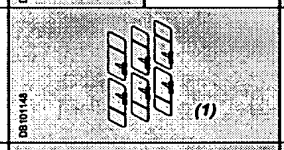
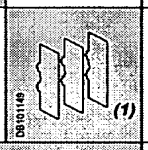
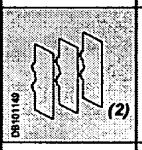
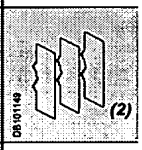
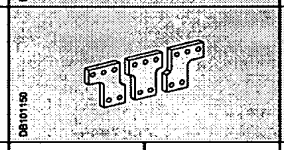
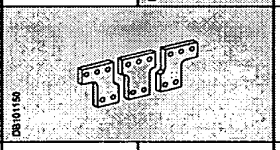
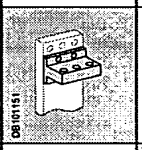
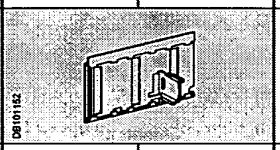
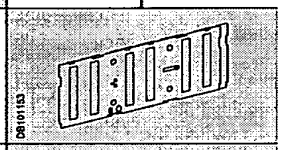
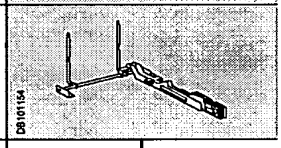
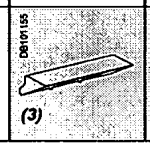
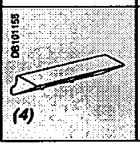






Note: *Masterpact circuit breakers can be connected indifferently with bare-copper, tinned-copper and tinned-aluminium conductors, requiring no particular treatment.*

Connections
Optional accessories

Type of accessory	Masterpact NT06 to NT16				Masterpact NW08 to NW63			
	Fixed		Drawout		Fixed		Drawout	
	Front connection	Rear connection	Front connection	Rear connection	Front connection	Rear connection	Front connection	Rear connection
Vertical connection adapters								
Cable lug adapters								
Interphase barriers	 (1)			 (1)		 (2)		 (2)
Spreaders								
Disconnectable front-connection adapter								
Safety shutters with padlocking								
Shutter position indication and locking								
Arc chute screen	 (3)	 (4)						

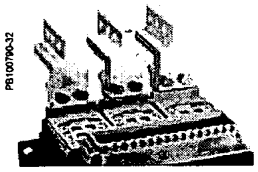
(1) Mandatory for voltages > 500 V.
(2) Except for an NW40 equipped for horizontal rear connection, and for fixed NW40b-NW63.
(3) Mandatory for 1000 V and for fixed NT front-connection versions with vertical-connection adapters oriented towards the front.
(4) Mandatory for 1000 V.

Masterpact M replacement kit

A set of connection parts is available to allow replacement of a Masterpact M08 to M32 circuit breaker by a Masterpact NW without modifying the busbars (please consult us).

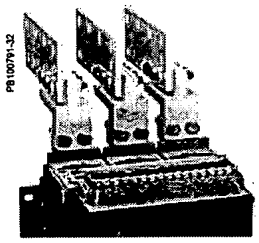
Mounting on a switchboard backplate using special brackets

Masterpact NT and NW fixed front-connected circuit breakers can be installed on a backplate without any additional accessories.
Masterpact NW circuit breakers require a set of special brackets.



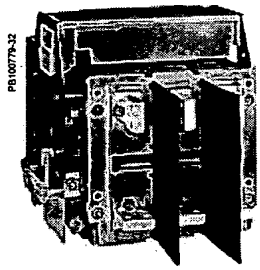
Vertical-connection adapters

Mounted on front-connected devices or chassis, the adapters facilitate connection to a set of vertical busbars.



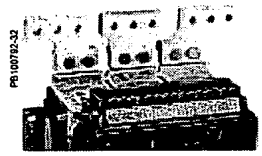
Cable-lug adapters

Cable-lug adapters are used in conjunction with vertical-connection adapters.
They can be used to connect a number of cables fitted with lugs.
To ensure adequate mechanical strength, the connectors must be secured together via spacers (**catalogue number 07251**).



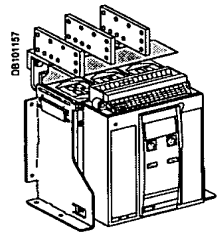
Interphase barriers

These barriers are flexible insulated partitions used to reinforce isolation of connection points in installations with busbars, whether insulated or not.
For Masterpact NT/NW devices, they are installed vertically between rear connection terminals. They are mandatory for NT devices at voltages > 500 V.



Spreaders

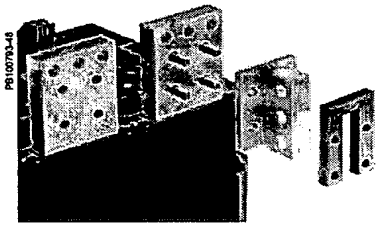
Mounted on the front or rear connectors, spreaders are used to increase the distance between bars in certain installation configurations.



Arc chute screen

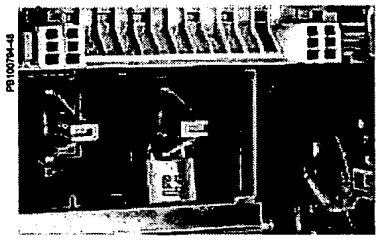
For fixed Masterpact NT front-connection versions and with vertical-connection adapters oriented towards the front, an arc chute screen must be installed to respect safety clearances.

For Masterpact NT 1000 V, an arc chute screen must be installed to respect safety clearances.



Disconnectable front-connection adapter

Mounted on a fixed front-connected device, the adapter simplifies replacement of a fixed device by enabling fast disconnection from the front.



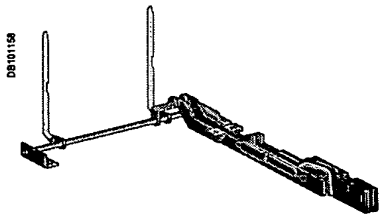
Safety shutters

Mounted on the chassis, the safety shutters automatically block access to the disconnecting contact cluster when the device is in the disconnected or test positions (degree of protection IP 20) When the device is removed from its chassis, no live parts are accessible.
The shutter-locking system is made up of a moving block that can be padlocked (padlock not supplied). The block:

- prevents connection of the device
- locks the shutters in the closed position.

For Masterpact NW08 to NW63
A support at the back of the chassis is used to store the blocks when they are not used:

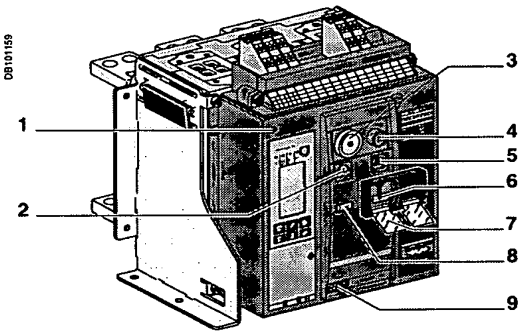
- 2 blocks for NW08 to NW40
- 4 blocks for NW40b to NW63.



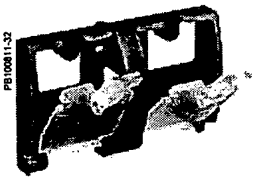
Shutter position indication and locking on front face

This option located on the chassis front plate indicates that the shutters are closed. It is possible to independently or separately padlock the two shutters using one to three padlocks (not supplied).

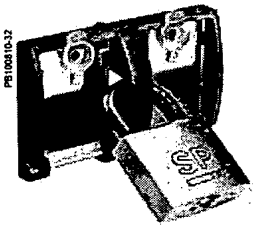
Locking
On the device



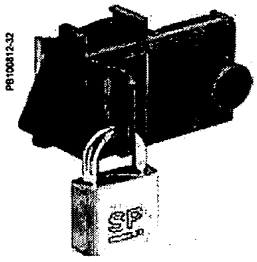
1 *Reset button for mechanical trip indication.*
2 *OFF pushbutton.*
3 *OFF position lock.*
4 *Electrical closing pushbutton.*
5 *ON pushbutton.*
6 *Springs charged indication.*
7 *Pushbutton locking.*
8 *Contact position indication.*
9 *Operation counter.*



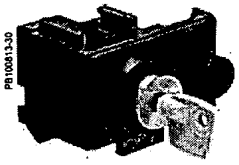
Access to pushbuttons protected by transparent cover.



Pushbutton locking using a padlock.



OFF position locking using a padlock.



OFF position locking using a keylock.

Pushbutton locking

The transparent cover blocks access to the pushbuttons used to open and close the device.
It is possible to independently lock the opening button and the closing button.
The locking device is often combined with a remote operating mechanism.
The pushbuttons may be locked using either:
- three padlocks (not supplied)
- lead seal
- two screws.

Device locking in the OFF position

The circuit breaker is locked in the OFF position by physically maintaining the opening pushbutton pressed down:
- using padlocks (one to three padlocks, not supplied)
- using keylocks (one or two different keylocks, supplied).

Keys may be removed only when locking is effective (Profalux or Ronis type locks).
The keylocks are available in any of the following configurations:
- one keylock
- one keylock mounted on the device + one identical keylock supplied separately for interlocking with another device
- two different key locks for double locking.

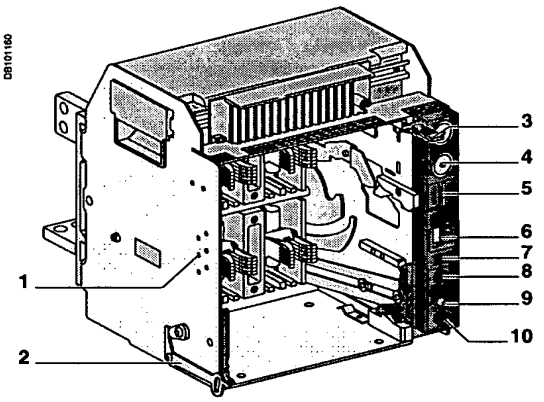
Profalux and Ronis keylocks are compatible with each other.
A locking kit (without locks) is available for installation of one or two keylocks (Ronis, Profalux, Kirk or Castell).

Accessory-compatibility
For Masterpact NT: 3 padlocks or 1 keylock
For Masterpact NW: 3 padlocks and/or 2 keylocks

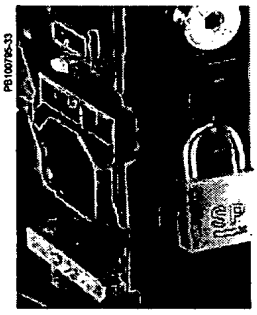
Cable-type door interlock

This option prevents door opening when the circuit breaker is closed and prevents circuit breaker closing when the door is open.
For this, a special plate associated with a lock and a cable is mounted on the right side of the circuit breaker.
With this interlock installed, the source changeover function cannot be implemented.

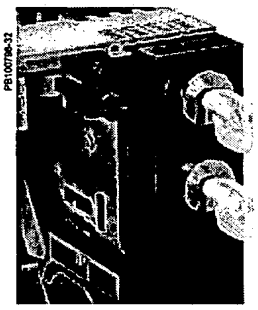
Locking
On the chassis



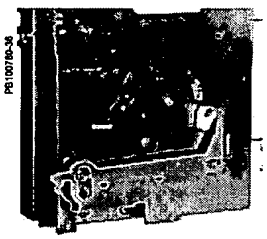
1 Mismatch protection.
2 Door interlock.
3 Racking interlock.
4 Keylock locking.
5 Padlock locking.
6 Position indicator.
7 Chassis front plate (accessible with cubicle door closed).
8 Racking-handle entry.
9 Reset button.
10 Racking-handle storage.



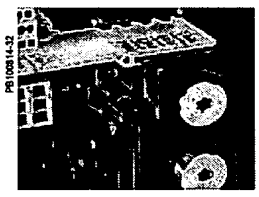
"Disconnected" position locking by padlocks.



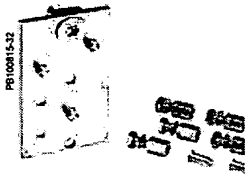
"Disconnected" position locking by keylocks.



Door interlock.



Racking interlock.



Mismatch protection.

"Disconnected" position locking

Mounted on the chassis and accessible with the door closed, these devices lock the circuit breaker in the "disconnected" position in two manners:
- using padlocks (standard), up to three padlocks (not supplied)
- using keylocks (optional), one or two different keylocks are available.

Profalux and Ronis keylocks are available in different options:
- one keylock
- two different keylocks for double locking
- one (or two) keylocks mounted on the device + one (or two) identical keylocks supplied separately for interlocking with another device.

A locking kit (without locks) is available for installation of one or two keylocks (Ronis, Profalux, Kirk or Castell).

"Connected", "disconnected" and "test" position locking

The "connected", "disconnected" and "test" positions are shown by an indicator. The exact position is obtained when the racking handle blocks. A release button is used to free it.

On request, the "disconnected" position locking system may be modified to lock the circuit breaker in any of the three positions, "connected", "disconnected" and "test".

Door interlock catch

Mounted on the right or left-hand side of the chassis, this device inhibits opening of the cubicle door when the circuit breaker is in "connected" or "test" position. It the breaker is put in the "connected" position with the door open, the door may be closed without having to disconnect the circuit breaker.

Racking interlock

This device prevents insertion of the racking handle when the cubicle door is open.

Cable-type door interlock

This option is identical for fixed and drawout versions.

Racking interlock between crank and OFF pushbutton

This option makes it necessary to press the OFF pushbutton in order to insert the racking handle and holds the device open until the handle is removed.

Automatic spring discharge before breaker removal

This option discharges the springs before the breaker is removed from the chassis.

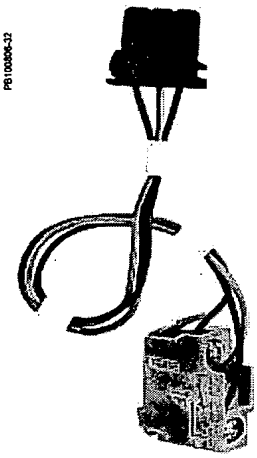
Mismatch protection

Mismatch protection ensures that a circuit breaker is installed only in a chassis with compatible characteristics. It is made up of two parts (one on the chassis and one on the circuit breaker) offering twenty different combinations that the user may select.

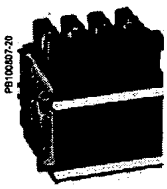
Indication contacts

Indication contacts are available:
- *in the standard version for relay applications*
- *in a low-level version for control of PLCs and electronic circuits.*

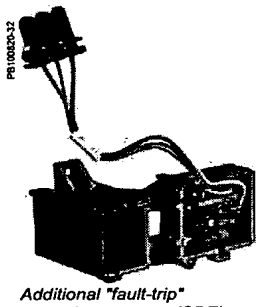
M2C and M6C contacts may be programmed via the Micrologic P and H control units.



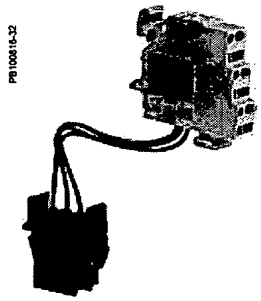
ON/OFF indication contacts (OF) (microswitch type).



ON/OFF indication contacts (OF) (rotary type).



Additional "fault-trip" indication contacts (SDE).



Combined contacts.

ON/OFF indication contacts (OF)

Two types of contacts indicate the ON or OFF position of the circuit breaker:
- microswitch type changeover contacts for Masterpact NT
- rotary type changeover contacts directly driven by the mechanism for Masterpact NW. These contacts trip when the minimum isolation distance between the main circuit-breaker contacts is reached.

OF				NT	NW
Supplied as standard				4	4
Maximum number				4	12
Breaking capacity (A) p.f.: 0.3 AC12/DC12	Standard			Minimum load: 100 mA/24 V	
		V AC	240/380	6	10/6 (1)
			480	6	10/6 (1)
			690	6	6
		V DC	24/48	2.5	10/6 (1)
			125	0.5	10/6 (1)
			250	0.3	3
	Low-level			Minimum load: 2 mA/15 V DC	
		V AC	24/48	5	6
			240	5	6
			380	5	3
		V DC	24/48	5/2.5	6
			125	0.5	6
			250	0.3	3

(1) Standard contacts: 10 A; optional contacts: 6 A.

"Fault-trip" indication contacts (SDE)

Circuit-breaker tripping due to a fault is signalled by:
- a red mechanical fault indicator (reset)
- one changeover contact (SDE).

Following tripping, the mechanical indicator must be reset before the circuit breaker may be closed.

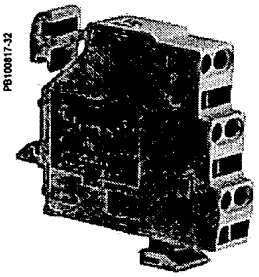
SDE				NT/NW
Supplied as standard				1
Maximum number				2
Breaking capacity (A) p.f.: 0.3 AC12/DC12	Standard			Minimum load: 100 mA/24 V
		V AC	240/380	5
			480	5
			690	3
		V DC	24/48	3
			125	0.3
			250	0.15
	Low-level			Minimum load: 2 mA/15 V DC
		V AC	24/48	3
			240	3
			380	3
		V DC	24/48	3
			125	0.3
			250	0.15

Combined "connected/closed" contacts (EF)

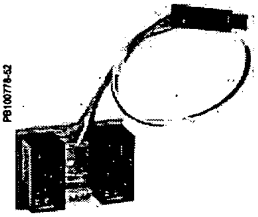
The contact combines the "device connected" and the "device closed" information to produce the "circuit closed" information.
Supplied as an option for Masterpact NW, it is mounted in place of the connector of an additional OF contact.

EF				NW
Maximum number				8
Breaking capacity (A) p.f.: 0.3 AC12/DC12	Standard			Minimum load: 100 mA/24 V
		V AC	240/380	6
			480	6
			690	6
		V DC	24/48	2.5
			125	0.8
			250	0.3
	Low-level			Minimum load: 2 mA/15 V DC
		V AC	24/48	5
			240	5
			380	5
		V DC	24/48	2.5
			125	0.8
			250	0.3

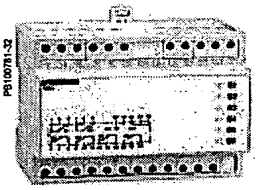
Indication contacts



CCE, CD and CT "connected/disconnected/test" position carriage switches.



M2C programmable contacts: circuit-breaker internal relay with two contacts.



M6C programmable contacts: circuit-breaker external relay with six independent changeover contacts controlled from the circuit breaker via a three-wire connection.

"Connected", "disconnected" and "test" position carriage switches

Three series of optional auxiliary contacts are available for the chassis:
- changeover contacts to indicate the "connected" position (CE)
- changeover contacts to indicate the "disconnected" position (CD). This position is indicated when the required clearance for isolation of the power and auxiliary circuits is reached
- changeover contacts to indicate the "test" position (CT). In this position, the power circuits are disconnected and the auxiliary circuits are connected.

Additional actuators

A set of additional actuators may be installed on the chassis to change the functions of the carriage switches.

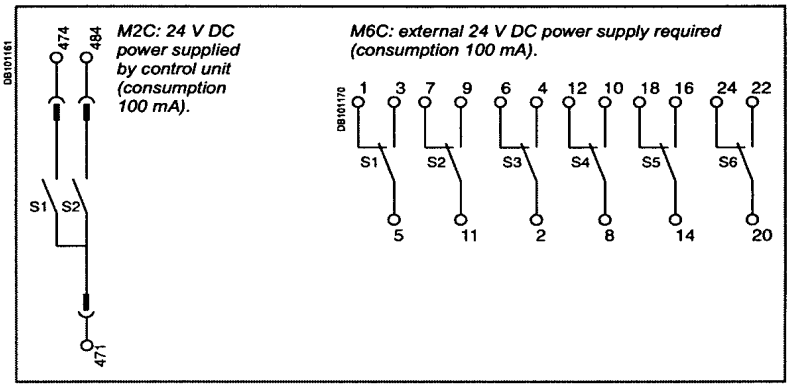
				NT	NW
Contacts				**CE/CD/CT**	**CE/CD/CT**
Maximum number	Standard			3 2 1	3 3 3
	with additional actuators				9 0 0
					6 3 0
					6 0 3
Breaking capacity (A)	Standard			Minimum load: 100 mA/24 V	
p.f.: 0.3		V AC	240	8	8
AC12/DC12			380	8	8
			480	8	8
			690	6	6
		V DC	24/48	2.5	2.5
			125	0.8	0.8
			250	0.3	0.3
	Low-level			Minimum load: 2 mA/15 V DC	
		V AC	24/48	5	5
			240	5	5
			380	5	5
		V DC	24/48	2.5	2.5
			125	0.8	0.8
			250	0.3	0.3

M2C / M6C programmable contacts

These contacts, used with the Micrologic P and H control units, may be programmed via the control unit keypad or via a supervisory station with the COM communication option. They require an external power supply module.

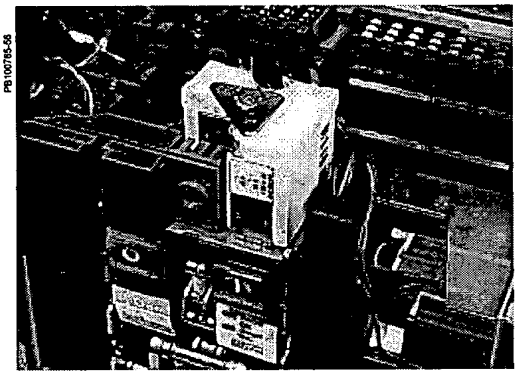
They indicate:
- the type of fault
- instantaneous or delayed threshold overruns.
- They may be programmed:
- with instantaneous return to the initial state
- without return to the initial state
- with return to the initial state following a delay.

Characteristics			**M2C/M6C**
Minimum load			100 mA/24 V
Breaking capacity (A)	V AC	240	5
p.f.: 0.7		380	3
	V DC	24	1.8
		48	1.5
		125	0.4
		250	0.15



Remote operation
Remote ON / OFF

Two solutions are available for remote operation of Masterpact devices:
- *a point-to-point solution*
- *a bus solution with the COM communication option.*



***Note:** an opening order always takes priority over a closing order.*

If opening and closing orders occur simultaneously, the mechanism discharges without any movement of the main contacts. The circuit breaker remains in the open position (OFF).

In the event of maintained opening and closing orders, the standard mechanism provides an anti-pumping function by blocking the main contacts in open position.

Anti-pumping function. After fault tripping or intentional opening using the manual or electrical controls, the closing order must first be discontinued, then reactivated to close the circuit breaker.
When the automatic reset after fault trip (RAR) option is installed, to avoid pumping following a fault trip, the automatic control system must take into account the information supplied by the circuit breaker before issuing a new closing order or blocking the circuit breaker in the open position (information on the type of fault, e.g. overload, short-time fault, earth fault, earth leakage, short-circuit, etc.).

***Note:** MX communicating releases are of the impulse type only and cannot be used to lock a circuit breaker in OFF position. For locking in OFF position, use the remote tripping function (2nd MX or MN).*

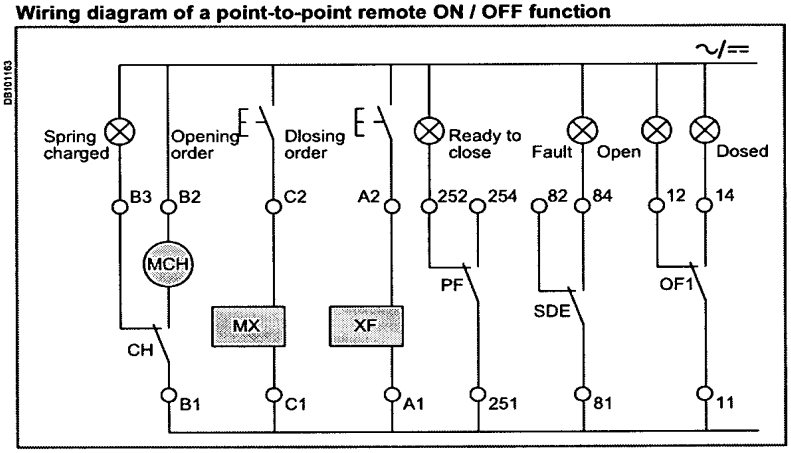
When MX or XF communicating releases are used, the third wire (C3, A3) must be connected even if the communication module is not installed. When the control voltage (C3-C1 or A3-A1) is applied to the MX or XF releases, it is necessary to wait 1.5 seconds before issuing an order. Consequently, it is advised to use standard MX or XF releases for applications such as source-changeover systems.

The remote ON / OFF function is used to remotely open and close the circuit breaker. It is made up of:
- an electric motor (MCH) equipped with a "springs charged" limit switch contact (CH)
- two voltage releases:
  - a closing release (XF)
  - an opening release (MX).

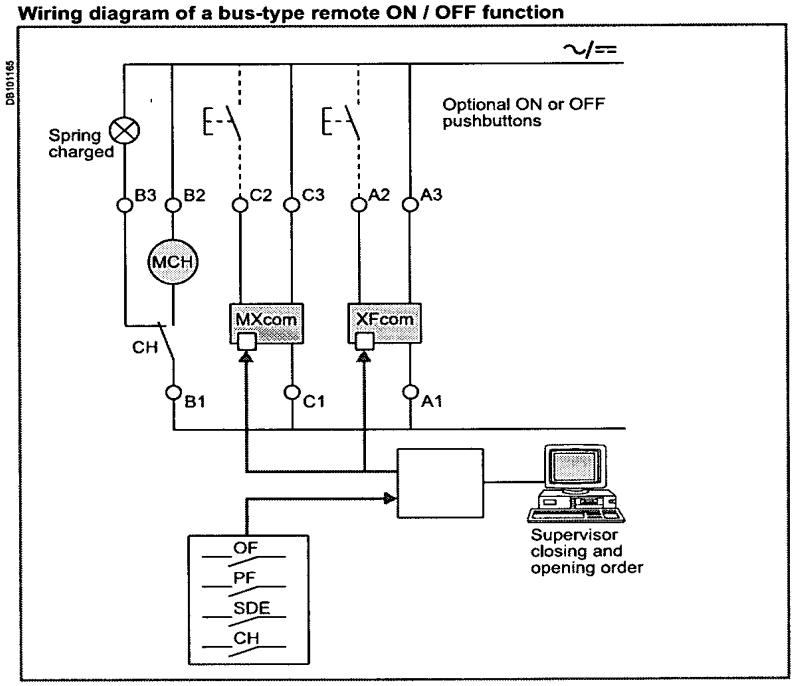
Optionally, other functions may be added:
- a "ready to close" contact (PF)
- an electrical closing pushbutton (BPFE)
- remote reset following a fault.

A remote-operation function is generally combined with:
- device ON / OFF indication (OF)
- "fault-trip" indication (SDE).

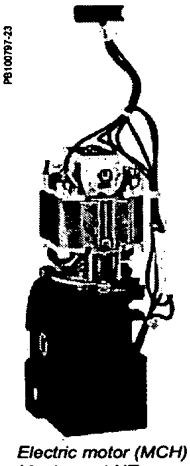
Wiring diagram of a point-to-point remote ON / OFF function



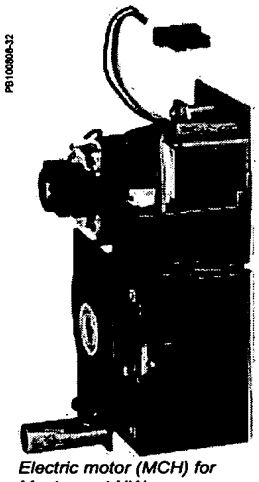
Wiring diagram of a bus-type remote ON / OFF function



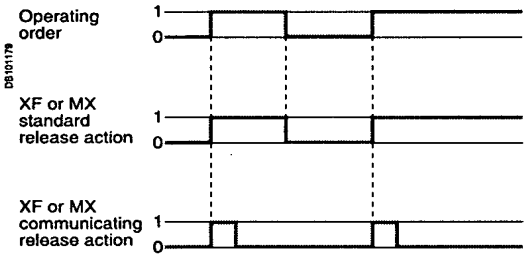
Remote operation
Remote ON / OFF

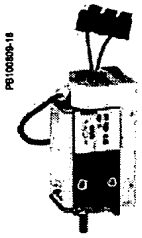


Electric motor (MCH) for Masterpact NT.

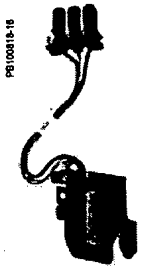


Electric motor (MCH) for Masterpact NW.





XF and MX voltage releases.



"Ready to close" contacts (PF).

Electric motor (MCH)

The electric motor automatically charges and recharges the spring mechanism when the circuit breaker is closed. Instantaneous reclosing of the breaker is thus possible following opening. The spring-mechanism charging handle is used only as a backup if auxiliary power is absent.
The electric motor (MCH) is equipped as standard with a limit switch contact (CH) that signals the "charged" position of the mechanism (springs charged).

Characteristics		
Power supply	V AC 50/60 Hz	48/60 - 100/130 - 200/240 - 277- 380/415 - 400/440 - 480
	V DC	24/30 - 48/60 - 100/125 - 200/250
Operating threshold		0.85 to 1.1 Un
Consumption (VA or W)		180
Motor overcurrent		2 to 3 In for 0.1 s
Charging time		maximum 3 s for Masterpact NT maximum 4 s for Masterpact NW
Operating frequency		maximum 3 cycles per minute
CH contact		10 A at 240 V

Voltage releases (XF and MX)

Their supply can be maintained or automatically disconnected.

Closing release (XF)

The XF release remotely closes the circuit breaker if the spring mechanism is charged.

Opening release (MX)

The MX release instantaneously opens the circuit breaker when energised. It locks the circuit breaker in OFF position if the order is maintained (except for MX "communicating" releases).

***Note:** whether the operating order is maintened or automatically disconnected (pulse-type), XF or MX "communicating" releases ("bus" solution with "COM" communication option) always have an impulse-type action (see diagram).*

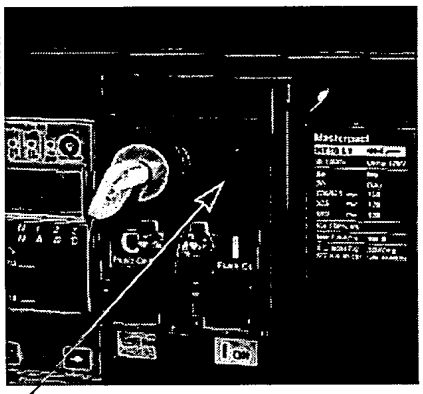
Characteristics		XF	MX
Power supply	V AC 50/60 Hz	24 - 48 - 100/130 - 200/250 - 277 - 380/480	
	V DC	12 - 24/30 - 48/60 - 100/130 - 200/250	
Operating threshold		0.85 to 1.1 Un	0.7 to 1.1 Un
Consumption (VA or W)		Hold: 4.5 Pick-up: 200 (200 ms)	Hold: 4.5 Pick-up: 200 (200 ms)
Circuit-breaker response time at Un		55 ms ±10 (Masterpact NT) 70 ms ±10 (NW ⩽ 4000A) 80 ms ±10 (NW > 4000A)	50 ms ±10

"Ready to close" contact (PF)

The "ready to close" position of the circuit breaker is indicated by a mechanical indicator and a PF changeover contact. This signal indicates that all the following are valid:

- ■ the circuit breaker is in the OFF position
- ■ the spring mechanism is charged
- ■ a maintained opening order is not present:
- □ MX energised
- □ fault trip
- □ remote tripping (second MX or MN)
- □ device not completely racked in
- □ device locked in OFF position
- □ device interlocked with a second device.

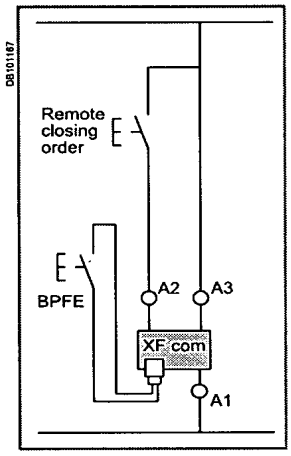
Characteristics				NT/NW
Maximum number				1
Breaking capacity (A) p.f.: 0.3 AC12/DC12	Standard			Minimum load: 100 mA/24 V
		V AC	240/380	5
			480	5
			690	3
		V DC	24/48	3
			125	0.3
			250	0.15
	Low-level			Minimum load: 2 mA/15 V DC
		V AC	24/48	3
			240	3
			380	3
		V DC	24/48	3
			125	0.3
			250	0.15



Electrical closing pushbutton (BPFE).

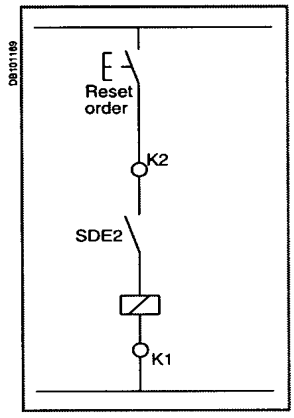
Electrical closing pushbutton (BPFE)

Located on the front panel, this pushbutton carries out electrical closing of the circuit breaker. It is generally associated with the transparent cover that protects access to the closing pushbutton.
Electrical closing via the BPFE pushbutton takes into account all the safety functions that are part of the control/monitoring system of the installation.
The BPFE connects to the closing release (XF) in place of the COM module.



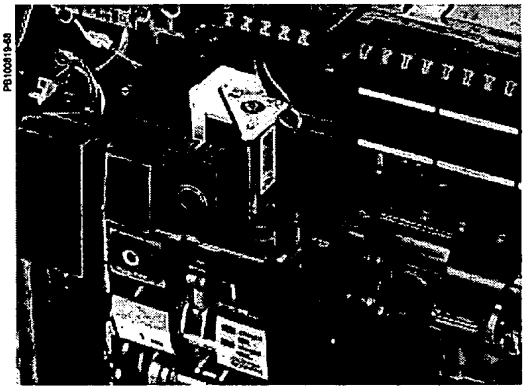
Remote reset after fault trip

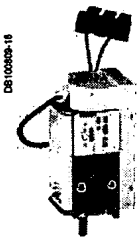
Electrical reset after fault trip (Res)
Following tripping, this function resets the "fault trip" indication contacts (SDE) and the mechanical indicator and enables circuit breaker closing.
Power supply: 110 / 130 V AC and 200 / 240 V AC.



Automatic reset after fault trip (RAR)
Following tripping, a reset of the mechanical indicator (reset button) is no longer required to enable circuit-breaker closing. The mechanical (reset button) and electrical (SDE) indications remain in fault position until the reset button is pressed.

Remote operation
Remote tripping



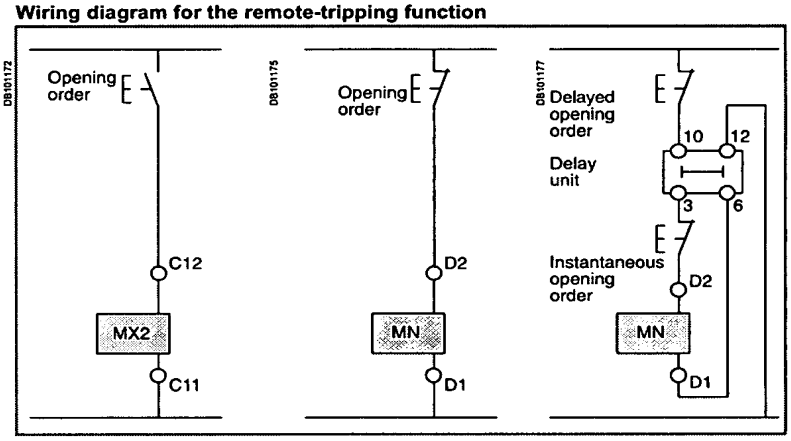


MX or MN voltage release.

This function opens the circuit breaker via an electrical order. It is made up of:
- a shunt release (second MX)
- or an undervoltage release (MN)
- or a delayed undervoltage release (MN + delay unit).

These releases (2nd MX or MN) cannot be operated by the communication bus. The delay unit, installed outside the circuit breaker, may be disabled by an emergency OFF button to obtain instantaneous opening of the circuit breaker.

Wiring diagram for the remote-tripping function



Voltage releases (second MX)

When energised, the MX voltage release instantaneously opens the circuit breaker. A continuous supply of power to the second MX locks the circuit breaker in the OFF position.

Characteristics			
Power supply	V AC 50/60Hz	24 - 48 - 100/130 - 200/250 - 277- 380/480	
	V DC	12 - 24/30 - 48/60 - 100/130 - 200/250	
Operating threshold		0.7 to 1.1 Un	
Permanent locking function		0.85 to 1.1 Un	
Consumption (VA or W)		Pick-up: 200 (200 ms)	Hold: 4.5
Circuit-breaker response time at Un		50 ms ±10	

Instantaneous voltage releases (MN)

The MN release instantaneously opens the circuit breaker when its supply voltage drops to a value between 35 % and 70 % of its rated voltage. If there is no supply on the release, it is impossible to close the circuit breaker, either manually or electrically. Any attempt to close the circuit breaker has no effect on the main contacts. Circuit-breaker closing is enabled again when the supply voltage of the release returns to 85 % of its rated value.

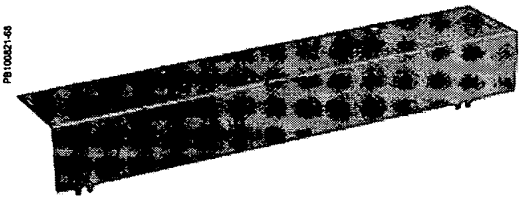
Characteristics			
Power supply	V AC 50/60 Hz	24 - 48 - 100/130 - 200/250 - 380/480	
	V DC	24/30 - 48/60 - 100/130 - 200/250	
Operating threshold	Opening	0.35 to 0.7 Un	
	Closing	0.85 Un	
Consumption (VA or W)		Pick-up: 200 (200 ms)	Hold: 4.5
MN consumption with delay unit (VA or W)		Pick-up: 200 (200 ms)	Hold: 4.5
Circuit-breaker response time at Un		40 ms ±5 for NT 90 ms ±5 for NW	

MN delay units

To eliminate circuit-breaker nuisance tripping during short voltage dips, operation of the MN release can be delayed. This function is achieved by adding an external delay unit in the MN voltage-release circuit. Two versions are available, adjustable and non-adjustable.

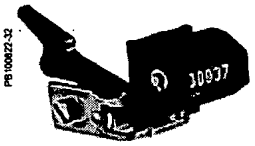
Characteristics			
Power supply	Non-adjustable	100/130 - 200/250	
V AC 50-60 Hz /DC	Adjustable	48/60 - 100/130 - 200/250 - 380/480	
Operating threshold	Opening	0.35 to 0.7 Un	
	Closing	0.85 Un	
Consommation du retardateur		Pick-up: 200 (200 ms)	Hold: 4.5
Circuit-breaker response time at Un	Non-adjustable	0.25 s	
	Adjustable	0.5 s - 0.9 s - 1.5 s - 3 s	

Accessories



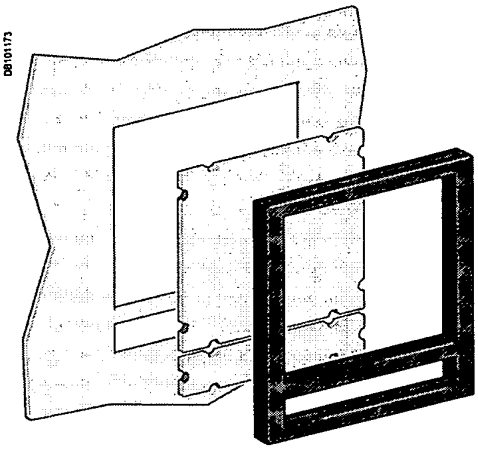
Auxiliary terminal shield (CB)

Optional equipment mounted on the chassis, the shield prevents access to the terminal block of the electrical auxiliaries.



Operation counter (CDM)

The operation counter sums the number of operating cycles and is visible on the front panel. It is compatible with manual and electrical control functions.



Escutcheon (CDP) with blanking plate.

Escutcheon (CDP)

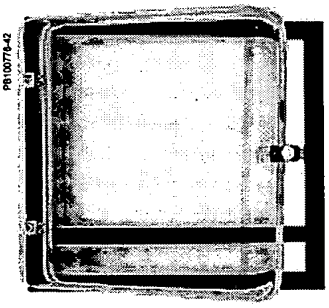
Optional equipment mounted on the door of the cubicle, the escutcheon increases the degree of protection to IP 40 (circuit breaker installed free standing: IP30) .
It is available in fixed and drawout versions.

Blanking plate (OP) for escutcheon

Used with the escutcheon, this option closes off the door cut-out of a cubicle not yet equipped with a device. It may be used with the escutcheon for both fixed and drawout devices.

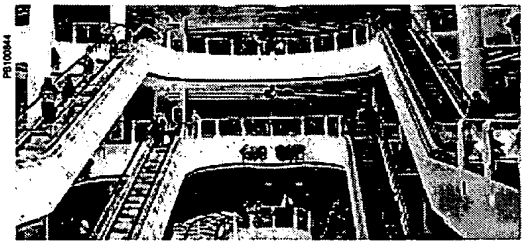
Transparent cover (CP) for escutcheon

Optional equipment mounted on the escutcheon, the cover is hinged and secured by a screw. It increases the degree of protection to IP54, IK10. It adapts to drawout devices.



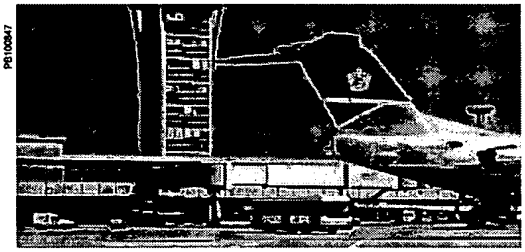
Transparent cover (CP) for escutcheon.

Source-changeover systems
Presentation



Service sector:
- *hospital operating rooms*
- *safety systems for tall buildings*
- *computer rooms (banks, insurance companies, etc.)*
- *lighting systems in shopping centres.*

Industry:
- *assembly lines*
- *propulsion systems on ships*
- *essential auxiliaries in thermal power stations...*



Infrastructure:
- *port and railway installations*
- *runway lighting systems*
- *control systems for military installations...*

Manual source-changeover systems
A manual source-changeover system is made up of:
- 2 devices (for connecting rod systems) or 2 to 3 devices (for cable systems)
- a connecting-rod or cable type mechanical interlocking system.

Remote-operated source-changeover systems
This is the most commonly employed system. No intervention by human operators is required. The switch from the normal to the replacement source is controlled electrically.
A remote-operated source-changeover system is made up of two or three circuit breakers or switch-disconnectors linked by:
- an electrical interlocking system implemented in a number of manners
- a mechanical interlocking system that protects against the consequences of an electrical malfunction and inhibits incorrect manual operation.

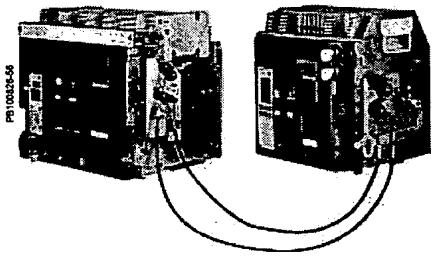
Automatic source-changeover systems
An automatic controller may be added to a remote-operated source-changeover system for automatic source control according to programmable operating modes. This solution provides optimal energy management:
- switching to a replacement source depending on any external conditions
- management of power sources
- regulation
- emergency source replacement, etc.

A communications function for dialogue with a supervisor is available for the automatic controller.

Communication option
The communication option must not be used to control the opening or closing of source-changeover system circuit breakers. It should be used only to transmit measurement data or circuit-breaker status.
The eco COM option is perfectly suited to these equipments.

Source-changeover systems
Mechanical interlocking

Electrical interlocking of two or three devices is used to create a remote-operated source-changeover system.
A basic mechanical interlocking system enhances the reliability of system operation.



Interlocking of two devices using cables.

Interlocking of two devices using cables

To ensure a continuous supply of power, certain electrical installations are connected to two power sources:
- a normal source N
- a replacement source R which supplies the installation when source N is not available.

A source-changeover system switches between the two sources. The system may include an automatic controller which manages switching according to external conditions. A source-changeover system may comprise two or three circuit breakers or switch-disconnectors.

Interlocking of two devices using connecting rods

The two devices must be stack mounted.
This function requires:
- an adaptation fixture on the right side of each device
- a set of connecting rods with no-slip adjustments.

The complete interlock kit is supplied for assembly by the customer.
Maximum vertical distance between the fixing planes: 900 mm.

Combinations of Masterpact Normal and Replacement source devices

Devices to be interlocked		NT		NW	
		Fixed	Drawout	Fixed	Drawout
NT	Fixed	■	-	-	-
	Drawout	-	■	-	-
NW	Fixed	-	-	■	■
	Drawout	-	-	■	■

Interlocking of two or three devices using cables

Using cables, the devices may be stack mounted or installed side-by-side.

Interlocking of two devices (Masterpact NT or NW)
This function requires:
- an adaptation fixture on the right side of each device
- a set of cables with no-slip adjustments.

Maximum distance between the fixing planes (vertical or horizontal): 2000 mm with a radius greater or equal to 100 mm.
For cases requiring greater distances between fixing planes, please consult us.

Interlocking of three devices (only Masterpact NW)
This function requires:
- an adaptation fixture (different for each type of interlocking) on the right side of each device
- two or three sets of cables with no-slip adjustments.

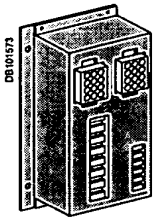
Maximum distance between the fixing planes (vertical or horizontal): 1000 mm with a radius greater or equal to 100 mm.
For cases requiring greater distances between fixing planes, please consult us.

Installation
The complete interlock kit is supplied for assembly by the customer.

Combinations of Masterpact Normal and Replacement source devices
All combinations of Masterpact NT and NW devices may be used together in a source-changeover system. Interlocked devices may be fixed or drawout, three or four pole, with different ratings and sizes.

Source-changeover systems
Electrical interlocking

Electrical interlocking is used with the mechanical interlocking system. It controls switching between sources. An automatic controller may be added to take into account information from the distribution system.



IVE unit.

Electrical interlocking requires an electrical control device.
This function can be implemented in one of two ways:
- using the IVE electrical interlocking unit
- by an electrician using the electrical systems presented in the diagrams in the "Source-changeover systems" section of this catalogue.

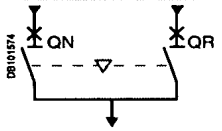
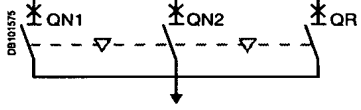
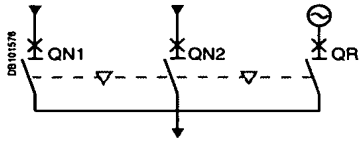
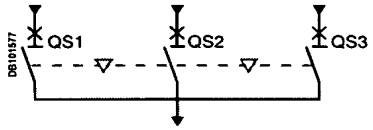
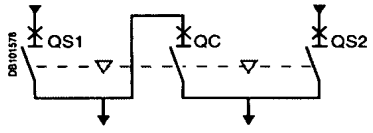
Characteristics of the IVE unit

- external connection terminal block:
  - inputs: control of devices
  - outputs: status of the SDE contacts on the Normal and Replacement source devices
- connector to the two Normal and Replacement source devices:
  - inputs:
    - status of the OF contacts on each device (ON or OFF)
    - status of the SDE contacts on the Normal and Replacement source devices
  - outputs: power supply for motor mechanisms
- control voltage:
  - 24 to 250 V DC
  - 48 to 415 V 50/60 Hz
  - 440 V 60 Hz.

The control voltage for the IVE electrical interlocking unit must be identical to that of the operating mechanism.

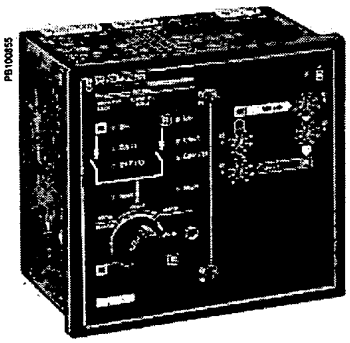
Necessary equipment

Each device must be equipped with:
- a remote-operation system made up of:
  - MCH gear motor
  - MX or MN opening release
  - XF closing release
  - PF "ready to close" contact
- an available OF contact
- one to three CE connected-position contacts for drawout devices.

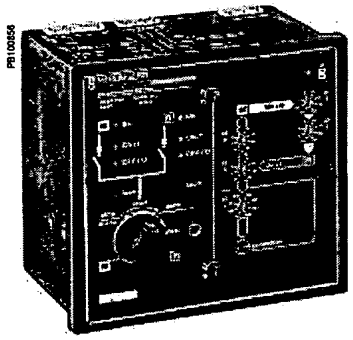
Types of mechanical interlocking	Possible combinations	Typical electrical diagrams	Diagram no.
2 devices			
	QN QR 0 0 1 0 0 1	■ electrical interlocking with lockout after fault: ■ automatic control with lockout after fault: □ permanent replacement source (with IVE) □ engine generator set (with IVE) ■ BA/UA controller (with IVE) ■ electrical interlocking with lockout after fault:	 **51156904** **51156905** **51156903**
3 devices: 2 "Normal" sources and 1 "Replacement" source			
	QN1 QN2 QR 0 0 0 1 1 0 0 0 1	■ electrical interlocking: □ without lockout after fault □ with lockout after fault	 **51156906** **51156907**
3 devices: 2 "Normal" sources and 1 "Replacement" source with source selection			
	QN1 QN2 QR 0 0 0 1 0 0 0 0 1 1 1 0 0 1 0	■ automatic control with engine generator set: □ without lockout after fault (with MN) □ with lockout after fault (with MN)	 **51156908** **51156909**
3 devices: 3 sources, only one device			
	QS1 QS2 QS3 0 0 0 1 0 0 0 1 0 0 0 1	■ electrical interlocking: □ without lockout after fault □ with lockout after fault	 **51156910** **51156911**
3 devices: 2 sources + 1 coupling			
	QS1 QC QS2 0 0 0 1 0 1 1 1 0 0 1 1 1 0 0 (1) 0 0 1 (1) *(1) possible by forcing operation*	■ electrical interlocking: □ without lockout after fault □ with lockout after fault ■ automatic control with lockout after fault	 **51156912** **51156913** **51156914**

"Lockout after fault" option. This option makes it necessary to manually reset the device following fault tripping.

By combining a remote-operated source-changeover system with an integrated BA or UA automatic controller, it is possible to automatically control source transfer according to user-selected sequences. These controllers can be used on source-changeover systems comprising 2 circuit breakers.
For source-changeover systems comprising 3 circuit breakers, the automatic control diagram must be prepared by the installer as a complement to to diagrams provided in the "electrical diagrams" section of this catalogue.



BA controller.



UA controller.

Controller		BA	UA
Compatible circuit breakers		All Compact NS and Masterpact circuit breakers	
4-position switch			
Automatic operation		■	■
Forced operation on "Normal" source		■	■
Forced operation on "Replacement" source		■	■
Stop (both "Normal" and "Replacement" sources off)		■	■
Automatic operation			
Monitoring of the "Normal" source and automatic changeover		■	■
Generator set startup control			■
Generator set shutdown control			■
Load shedding and reconnection of non-priority circuits			■
Changeover to the "Replacement" source if one of the phases of the "Normal" phase is absent			■
Test			
By opening the P25M circuit breaker supplying the controller		■	
By pressing the test button on the front of the controller			■
Indications			
Circuit breaker status indication on the front of the controller: on, off, fault trip		■	■
Automatic mode indicating contact		■	■
Other functions			
Selection of type of "Normal" source (single-phase or three-phase)			■
Voluntary transfer to "Replacement" source (e.g. energy management commands)		■	■
During peak-tariff periods (energy management commands), forced operation on "Normal" source if "Replacement" source not operational			■
Additional contact (not part of controller). Transfer to "Replacement" source only if contact is closed (e.g. used to test the frequency of UR).		■	■
Setting of maximum startup time for the replacement source			■
Options			
Communication option		■	
Power supply			
Control voltages (1)	220 to 240 V 50/60 Hz	■	■
	380 to 415 V 50/60 Hz	■	■
	440 V 60 Hz	■	■
Operating thresholds			
Undervoltage	0.35 Un ⩽ voltage ⩽ 0.7 Un	■	■
Phase failure	0.5 Un ⩽ voltage ⩽ 0.7 Un		■
Voltage presencevoltage	voltage ⩾ 0.85 Un	■	■
Characteristics of output contacts			
Rated thermal current (A)	8		
Minimum load	10 mA at 12 V		

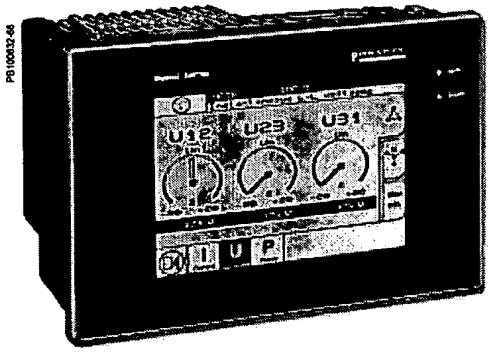
		CA				DC	
Utilisation category (IEC 60947-5-1)		AC12	AC13	AC14	AC15	DC12	DC13
Operational current (A)	24 V	8	7	5	6	8	2
	48 V	8	7	5	5	2	-
	110 V	8	6	4	4	0.6	-
	220/240 V	8	6	4	3	-	-
	250 V	-	-	-	-	0.4	-
	380/415 V	5	-	-	-	-	-
	440 V	4	-	-	-	-	-
	660/690 V	-	-	-	-	-	-

(1) The controller is powered by the ACP auxiliaries control plate. The same voltage must be used for the ACP plate, the IVE unit and the circuit breaker motor mechanisms. If this voltage is the same as the source voltage, then the "Normal" and "Replacement" sources can be used directly for the power supply. If not, a BC type or equivalent isolation transformer must be used.

Display modules

Perfectly integrated in the Compact and Masterpact ranges, Display modules are designed for use with Micrologic control units to provide instant and highly intuitive access to all the information provided by the circuit breakers, including device status, current, voltage and power values, etc.

DMB300 display module: basic and harmonic measurements.



DMC300 display module: measurements, harmonic analysis, diagnosis.

DMB300 and DMC300 display modules use the power and communications capabilities of the Micrologic control units to centralise the display of electrical values, status conditions and alarms of one or more Compact or Masterpact circuit breakers.
The mounting and cabling system for the display modules ensures fast, easy and reliable installation.
Start-up is immediate with no configuration or programming required.
Display modules are high-performance devices combining:
- simple and easy-to-read dials
- powerful and accurate digital processing.

Their small size and extensive communications capabilities make for easy and flexible installation and operation.

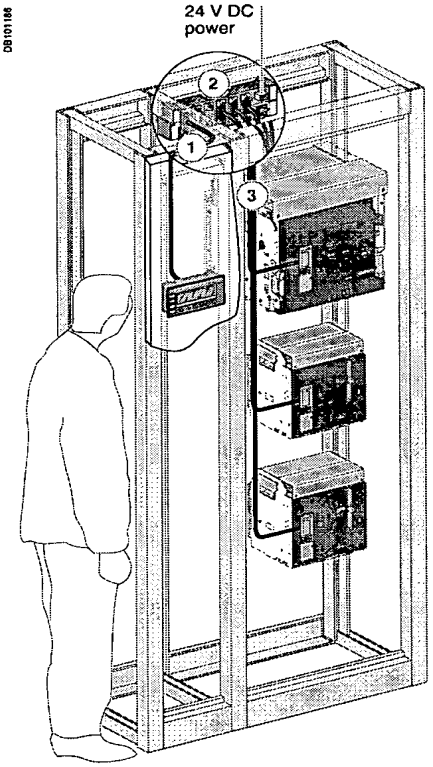
Display modules	DMB300			DMC300		
Associated circuit breakers						
Type	Compact or Masterpact equipped with Micrologic control units					
Number	1 to 4			1 to 16		
Display						
Screen type	Black and white			Colour, touch screen		
Screen size	240 x 64 pixels			5", 320 x 240 pixels		
Entry	5 buttons			Touch screen		
Information displayed						
Currents (per phase)						
Currents I1, I2, I3, IN	A	P	H	A	P	H
Maximum current	A	P	H	A	P	H
Earth-fault and earth-leakage currents	A	P	H	A	P	H
Demand current		P	H		P	H
Maximum demand current		P	H		P	H
Total harmonic distortion (THD)			H			H
Maximum total harmonic distortion			H			H
Amplitudes of individual harmonics						H
Voltages						
Phase-to-phase voltages (U_{1-2}, U_{2-3}, U_{3-1})		P	H		P	H
Minimum/maximum phase-to-phase voltages		P	H		P	H
Phase-to-neutral voltages (V_{1-N}, V_{2-N}, V_{3-N})		P	H		P	H
Minimum/maximum phase-to-neutral voltages					P	H
Frequency		P	H		P	H
Voltage imbalance (% per phase)		P	H		P	H
Total harmonic distortion (% per phase)			H			H
Maximum total harmonic distortion (% per phase)			H			H
Amplitudes of individual harmonics			H			H
Power						
Active (P), reactive (Q) and apparent (S) power			H		P	H
Power factor and cosφ		P	H		P	H
Maximum power (P, Q, S)		P	H		P	H
Demand power (P, Q, S)		P	H		P	H
Maximum demand power		P	H		P	H
Metering						
Active, reactive and apparent energy		P	H		P	H
On-line help						
	On-line help is available for each type of information supplied by the module					
Circuit-breaker diagnostics						
Identification of control units	A	P	H	A	P	H
Reading of protections	A	P	H	A	P	H
Circuit-breaker status	A	P	H	A	P	H
Type of trip	A	P	H	A	P	H
Current alarms		P	H		P	H
Maintenance indicator					P	H
Installation diagnosis						
Indication of faulty devices				A	P	H
Fault log				A	P	H
Installation and start-up						
Mounting	Mounted through door, without tools, using 6 spring-clips supplied with the mod.					
Connection	Prefabricated wiring systems					

Associated Micrologic control unit
A = Micrologic A
P = Micrologic P
H = Micrologic H

Display modules

Wiring system
The wiring system is designed for low-voltage power switchboards. Installation requires no tools or special skills.
The prefabricated wiring ensures both data transmission (ModBus protocol) and 24 V DC power distribution for the display module and the communications modules on the Micrologic control units.

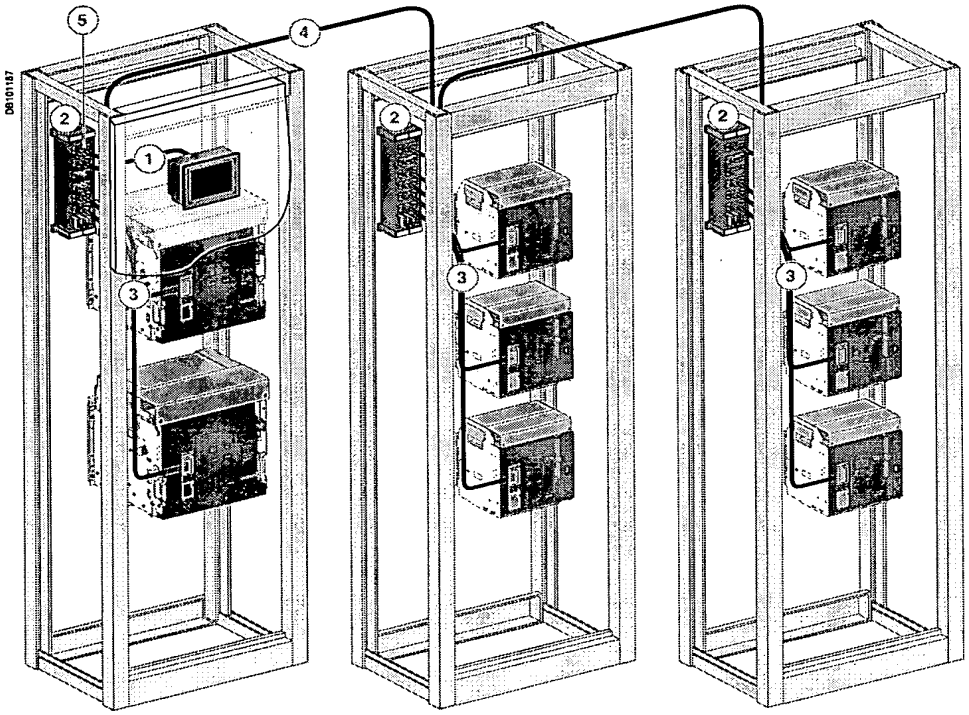
Connection of DMC300 display module



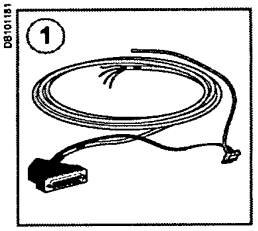
Masterpact circuit breakers equipped with Micrologic control units and the ModBus COM option.

Connection of DMB300 display module

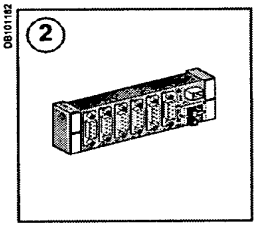
Maximum distance between module and circuit breaker: 1200 m.



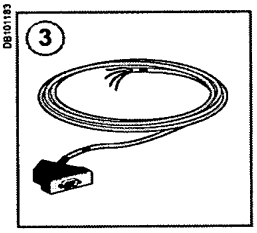
Masterpact circuit breakers equipped with Micrologic control units and the ModBus eco COM option.



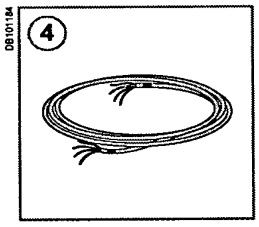
CDM 303:
Connection cable between display module and junction block.



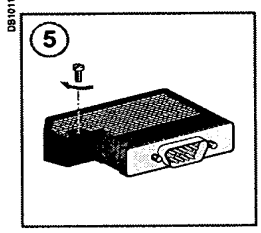
CJB 306 junction block.



CCP 303:
Connection cable between Masterpact or Compact and junction block.



CCR 301:
Roll of RS 485 cable (2 RS 485 wires + 2 power supply wires).

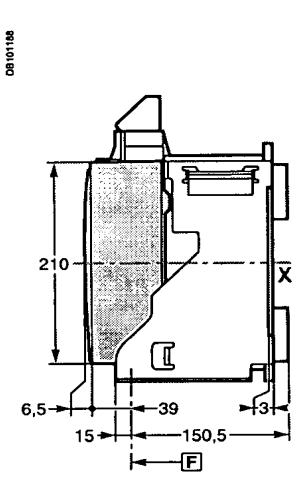


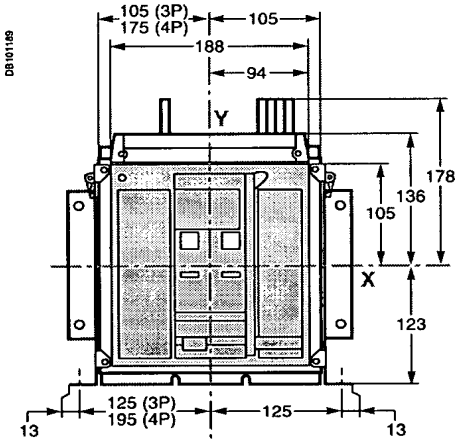
CSD 309:
SubD 9-pin connector for colour-coded connection of wires to screw terminals.

Dimensions and connection

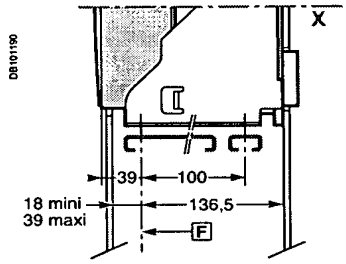
NT06 to NT16 circuit breakers
Fixed 3/4-poles device

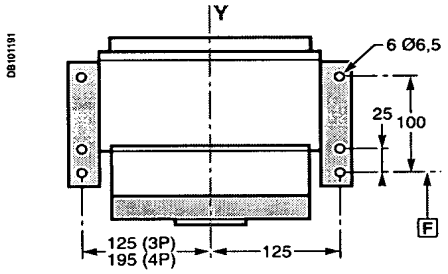
Dimensions



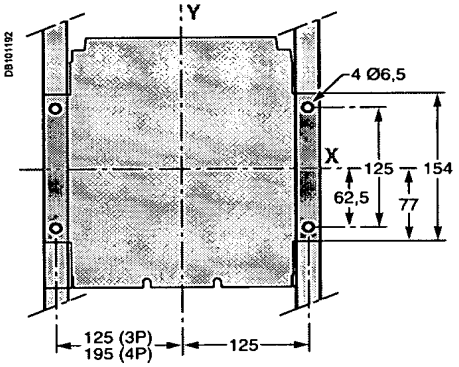


Bottom mounting (on base plate or rails)

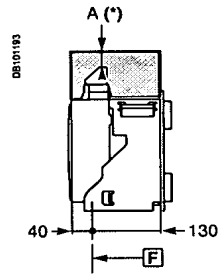


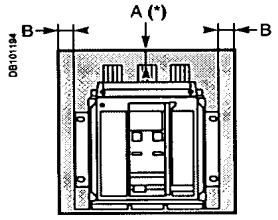


Rear mounting detail (on upright or backplate)

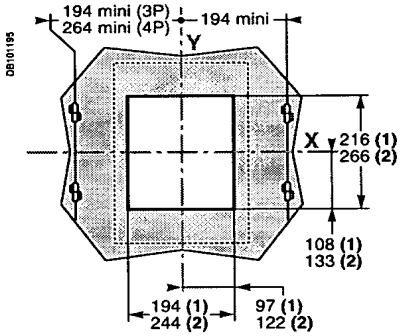


Safety clearances

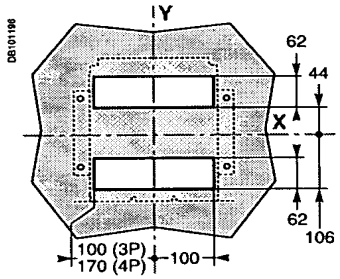




Door cutout



Rear panel cutout



For voltages < 690 V

	Parts		
	Insulated	Metal	Energised
A	0	0	100
B	0	0	60

For 1000 V

	Parts		
	Insulated	Metal	Energised
A	0	100	500 (3)
B	0	50	100 (3)

(3) With a minimum distance between bars of 65 mm (A and B) if the bars are not insulated.

F : *datum.*

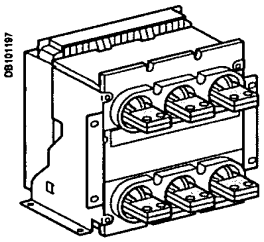
(1) Without escutcheon.
(2) With escutcheon.

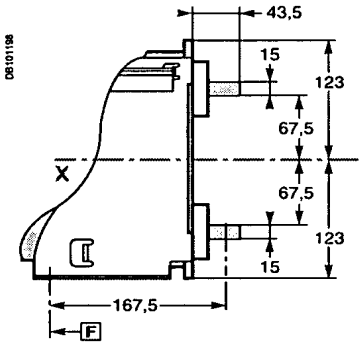
***Note:** X and Y are the symmetry planes for a 3-pole device.*
A(*) An overhead clearance of 50 mm is required to remove the arc chutes.
An overhead clearance of 20 mm is required to remove the terminal block.

NT06 to NT16 circuit breakers
Fixed 3/4-poles device

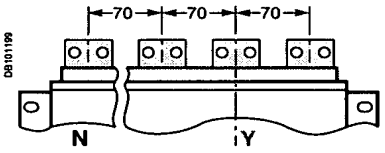
Connections

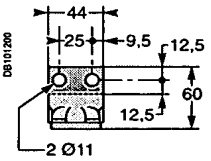
Horizontal rear connection



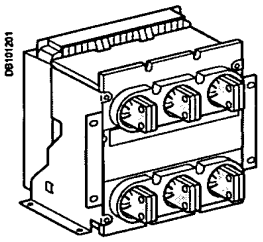


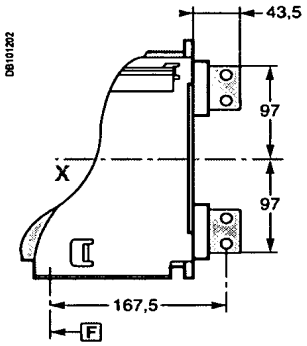
Detail



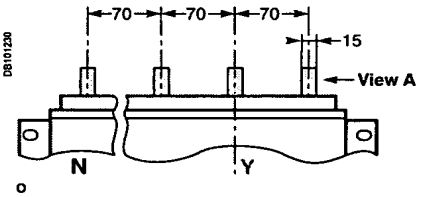


Vertical rear connection

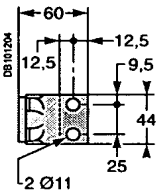




Detail

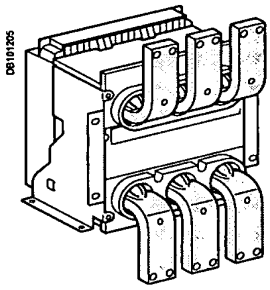


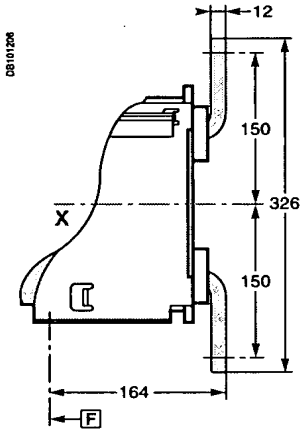
o



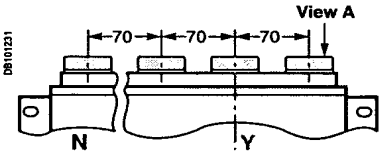
View A detail.

Front connection

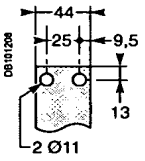




Detail

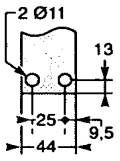


Top connection



View A detail.

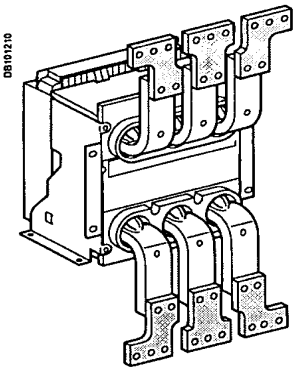
Bottom connection

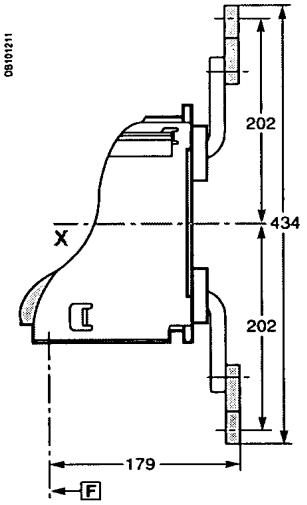


***Note:** recommended connection screws: **M10** class 8.8.*
*Tightening torque: **50 Nm** with contact washer.*

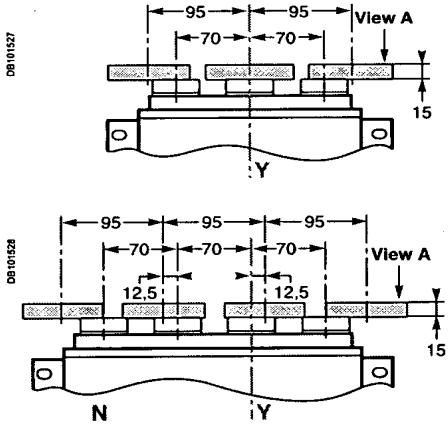
Connections

Front connection with spreaders

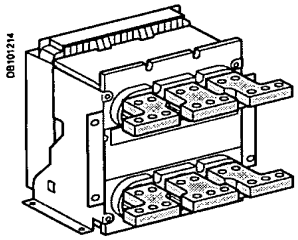


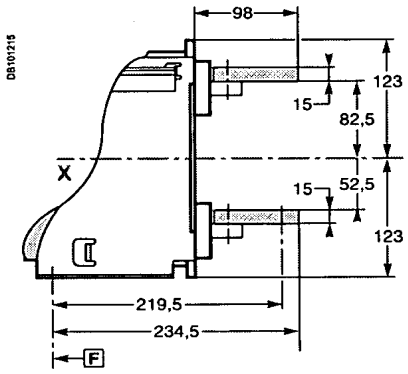


Detail

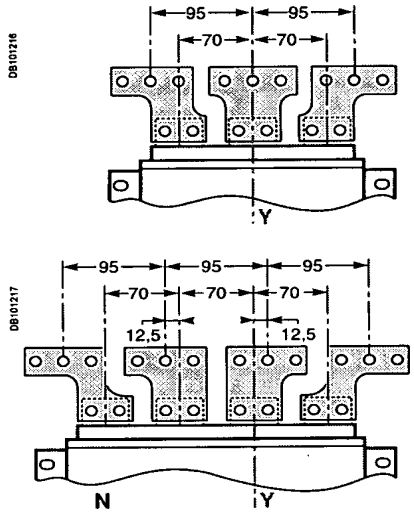


Rear connection with spreaders



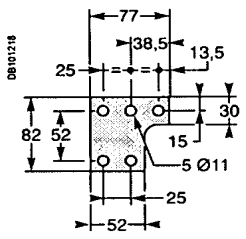


Detail



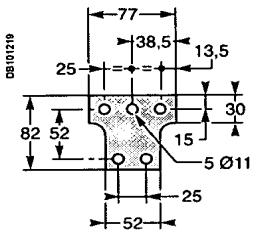
Spreader detail

Middle left or middle right spreader for 4P.

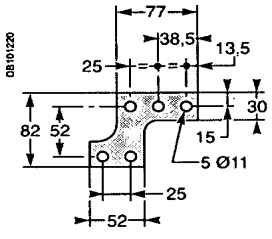


View A detail.

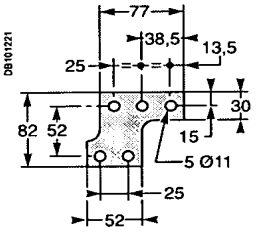
Middle spreader for 3P.



Left or right spreader for 4P.



Left or right spreader for 3P.



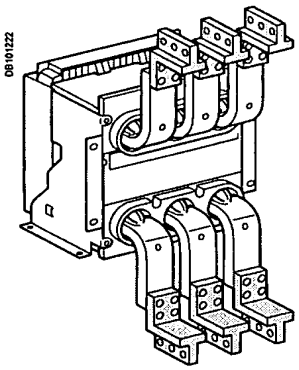
F : *datum.*

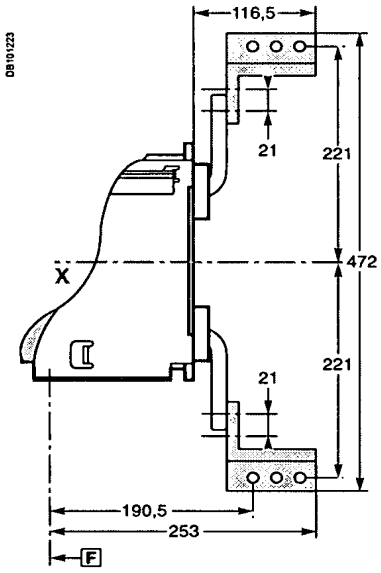
***Note:** X and Y are the symmetry planes for a 3-pole device.*

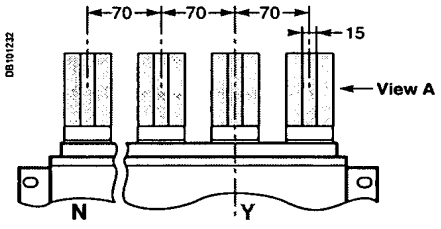
NT06 to NT16 circuit breakers
Fixed 3/4-poles device

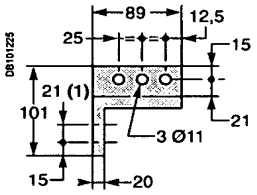
Connections

Front connection via vertical connection adapters — **Detail**



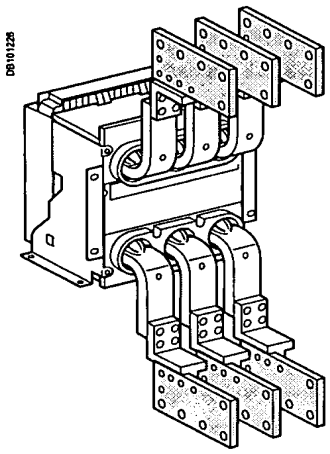


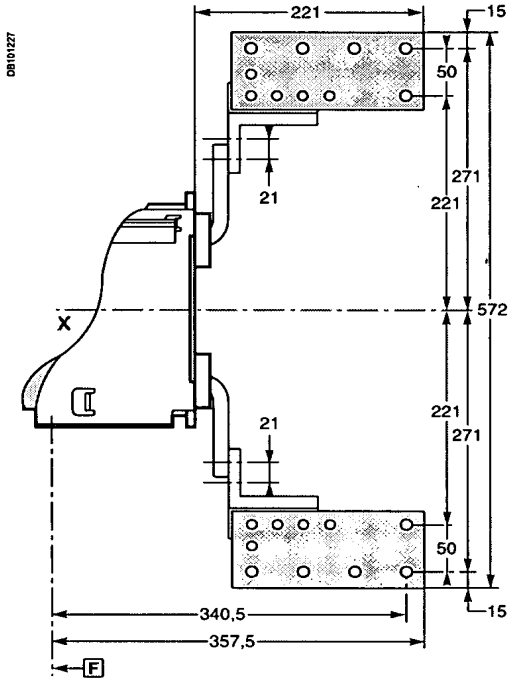


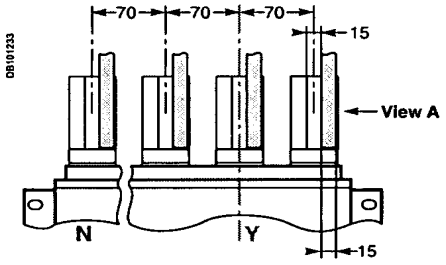


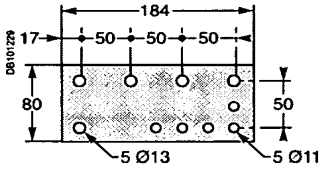
View A detail.

Front connection via vertical connection adapters fitted with cable-lug adapters — **Detail**









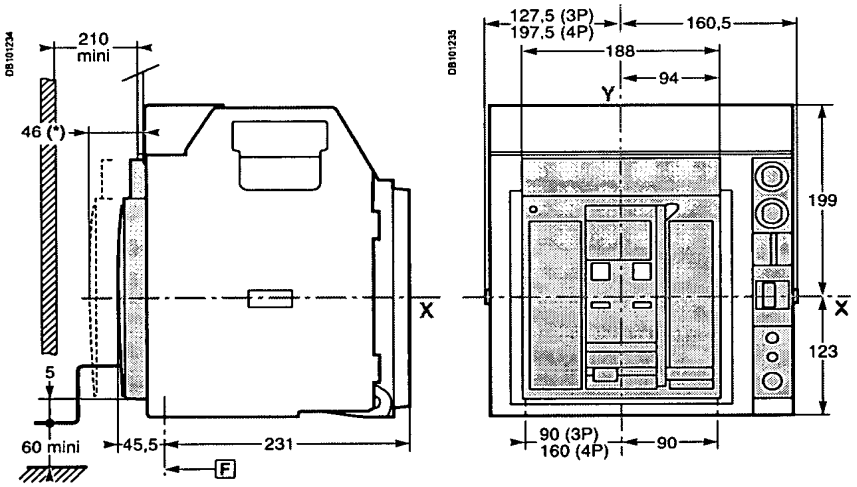
View A detail.

***Note:** recommended connection screws: **M10** class 8.8.*
*Tightening torque: **50 Nm** with contact washer.*

***(1)** 2 connection possibilities on vertical connection adapters (21 mm between centres).*

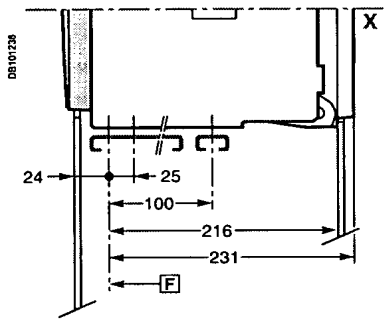
NT06 to NT16 circuit breakers
Drawout 3/4-poles device

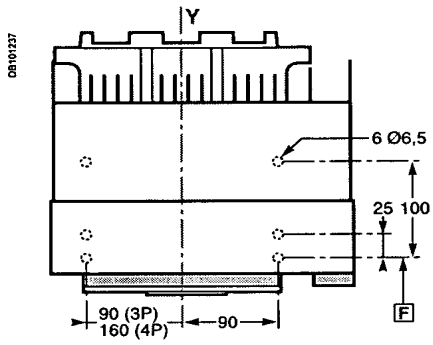
Dimensions



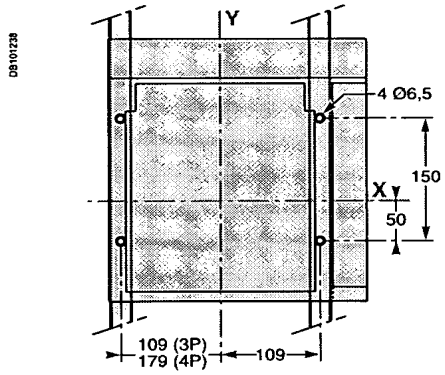
(*) Disconnected position.

Bottom mounting (on base plate or rails)

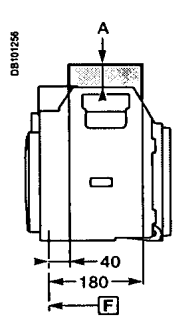


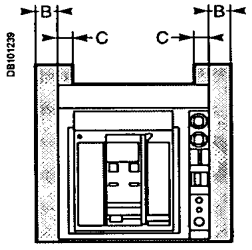


Rear mounting detail (on upright or backplate)

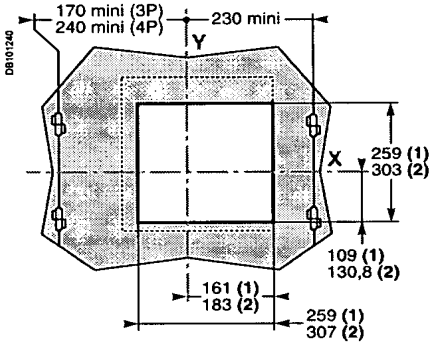


Safety clearances

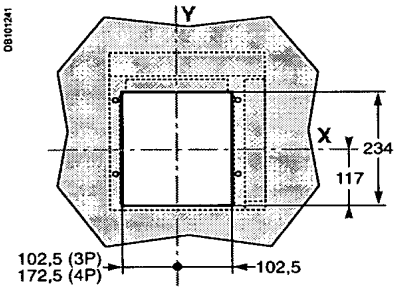




Door cutout



Rear panel cutout



For voltages < 690 V or equal to 1000 V.

	Parts		
	Insulated	Metal	Energised
A	0	0	30
B	10	10	60
C	0	0	30

F : *datum.*

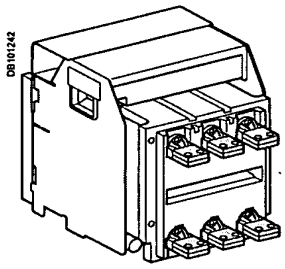
(1) Without escutcheon.
(2) With escutcheon.

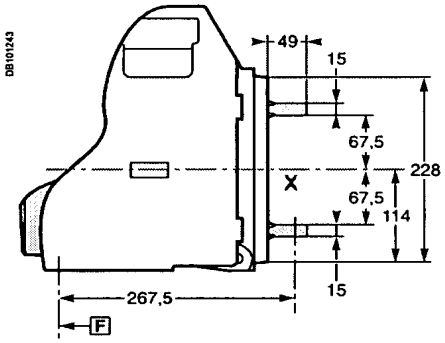
***Note:** X and Y are the symmetry planes for a 3-pole device.*

NT06 to NT16 circuit breakers
Drawout 3/4-poles device

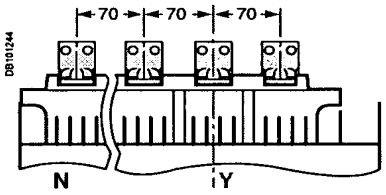
Connections

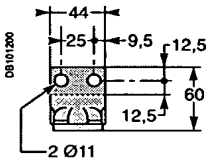
Horizontal rear connection



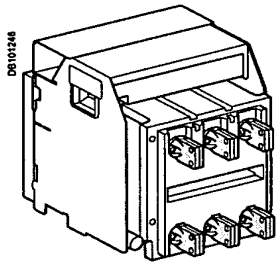


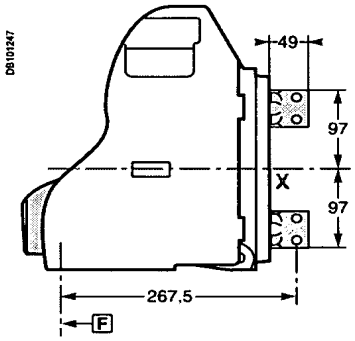
Detail



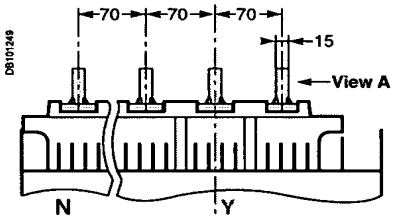


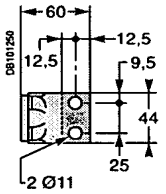
Vertical rear connection





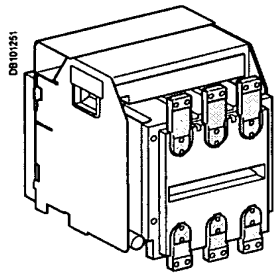
Detail

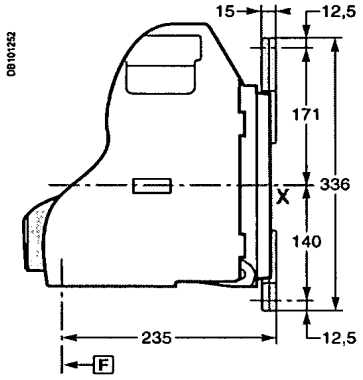




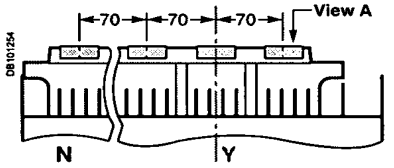
View A detail.

Front connection

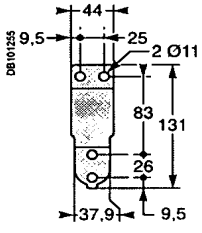




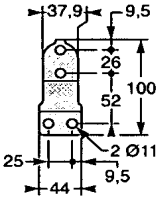
Detail



Top connection



Bottom connection

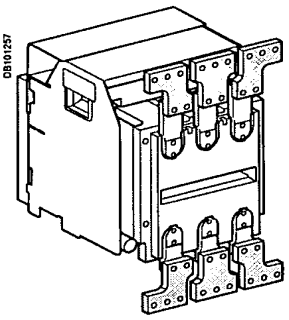


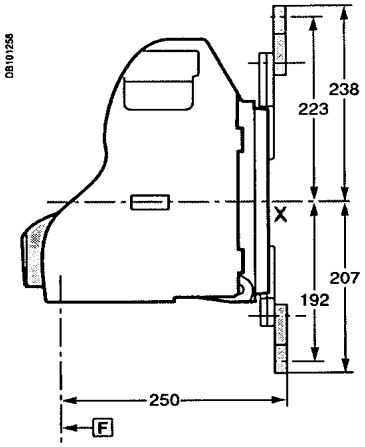
View A detail.

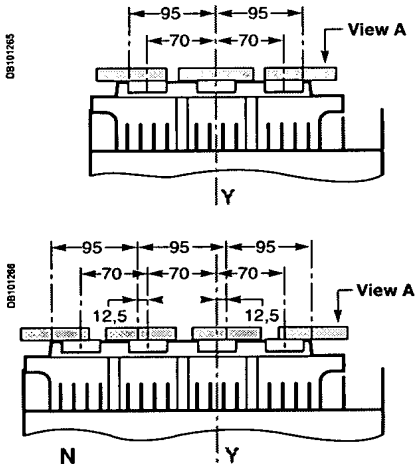
***Note:** recommended connection screws: **M10** class 8.8.*
*Tightening torque: **50 Nm** with contact washer.*

Connections

Front connection with spreaders

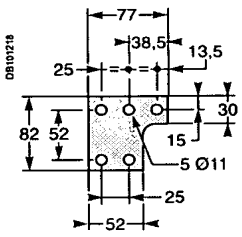






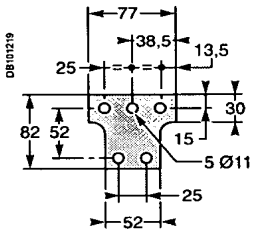
Spreader detail

Middle left or middle right spreader for 4P.

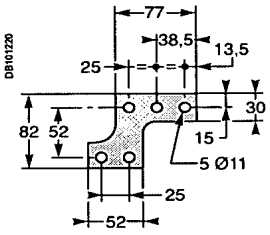


View A detail.

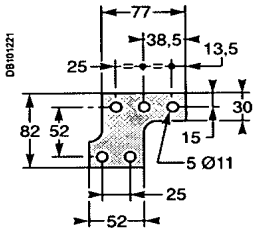
Middle spreader for 3P.



Left or right spreader for 4P.



Left or right spreader for 3P.



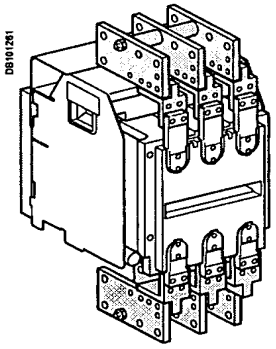
F : *datum.*

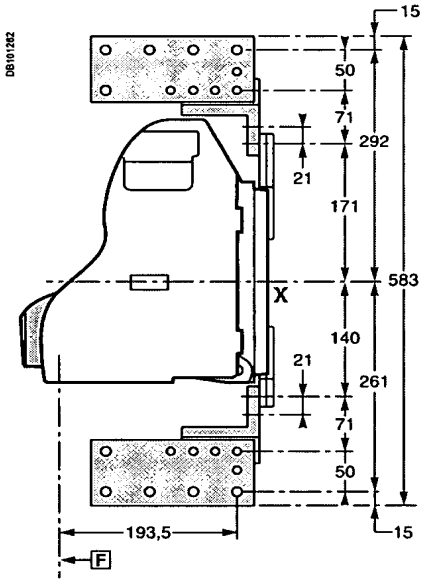
Note: X and Y are the symmetry planes for a 3-pole device.

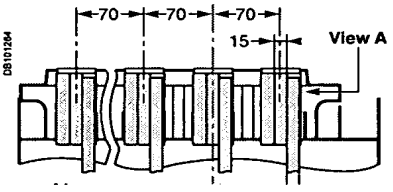
NT06 to NT16 circuit breakers
Drawout 3/4-poles device

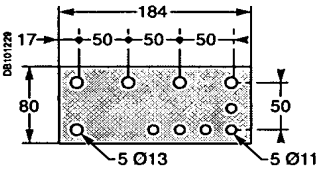
Connections

Front connection via vertical connection adapters fitted with cable-lug adapters







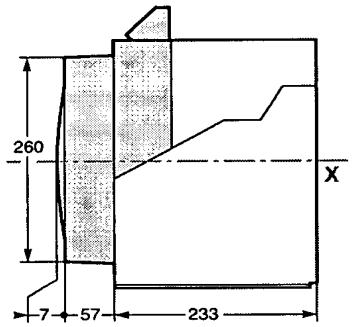


View A detail.

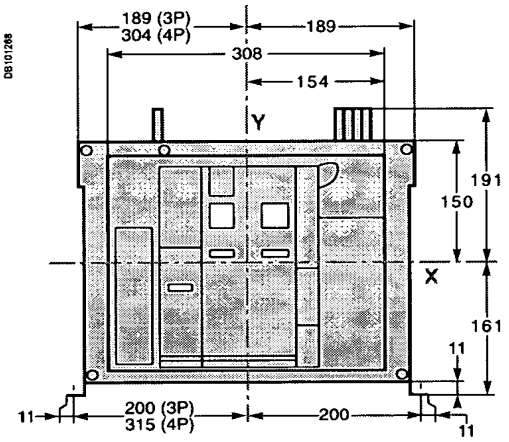
***Note:** recommended connection screws: **M10** class 8.8.*
*Tightening torque: **50 Nm** with contact washer.*

Dimensions

DB101267

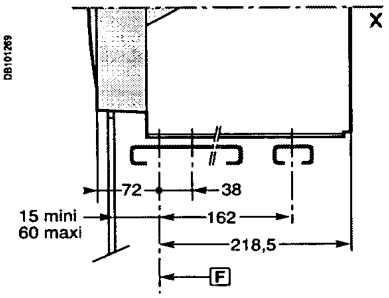


DB101268



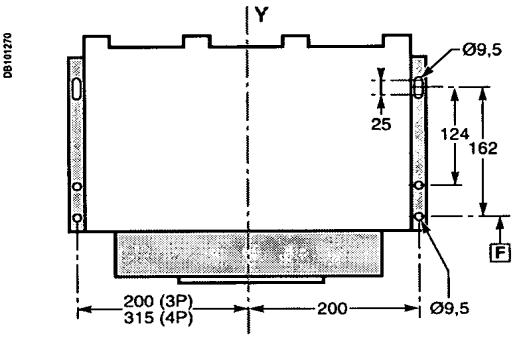
Mounting on base plate or rails

DB101269



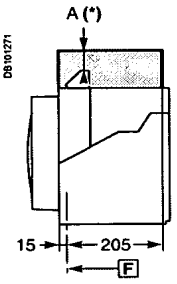
Mounting detail

DB101270

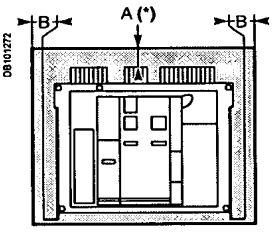


Safety clearances

DB101271

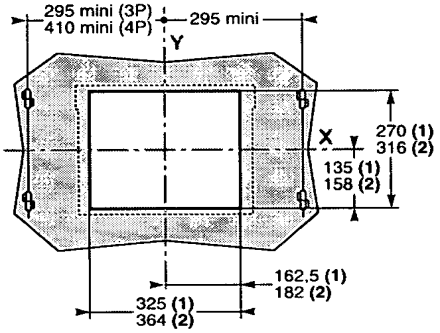


DB101272



Door cutout

DB101273



	Insulated parts	Metal parts	Energised parts
A	0	0	100
B	0	0	60

F : *datum.*

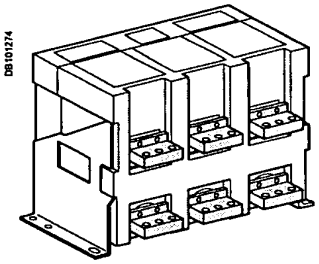
(1) Without escutcheon.
(2) With escutcheon.

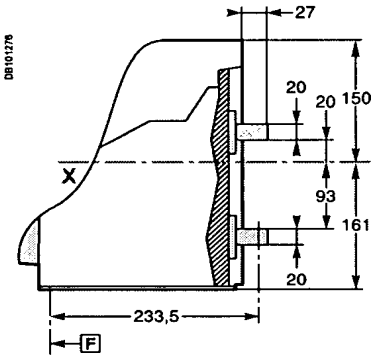
***Note:** X and Y are the symmetry planes for a 3-pole device.*
A(*) An overhead clearance of 50 mm is required to remove the arc chutes.
An overhead clearance of 20 mm is required to remove the terminal block.

NW08 to NW32 circuit breakers
Fixed 3/4-poles device

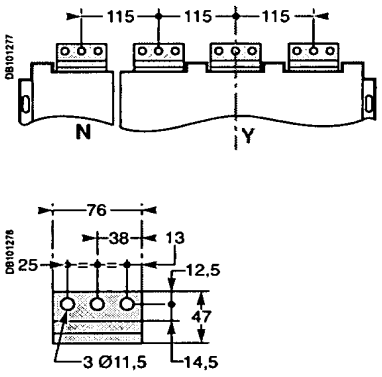
Connections

Horizontal rear connection

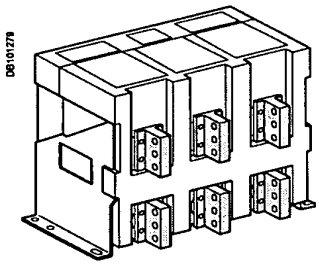


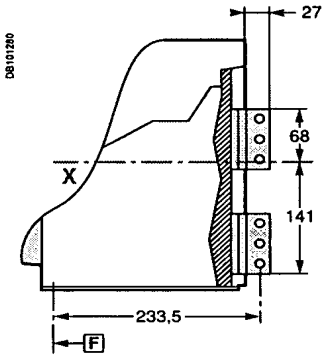


Detail

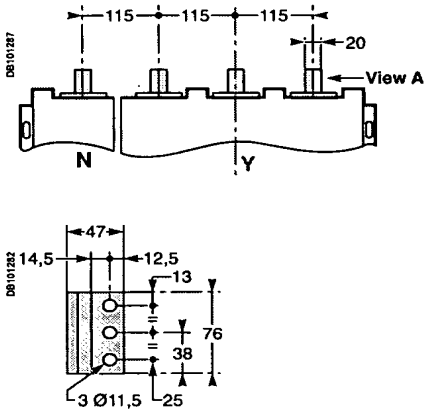


Vertical rear connection



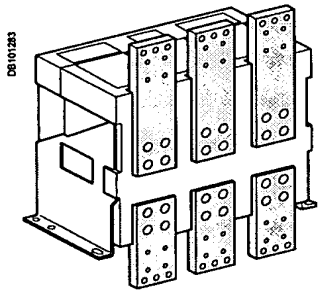


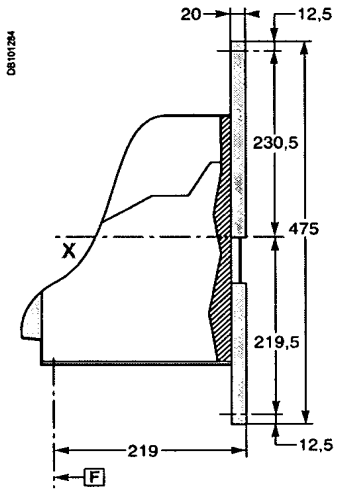
Detail



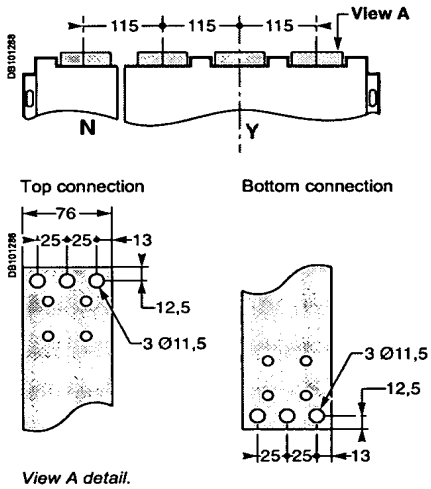
View A detail.

Front connection





Detail

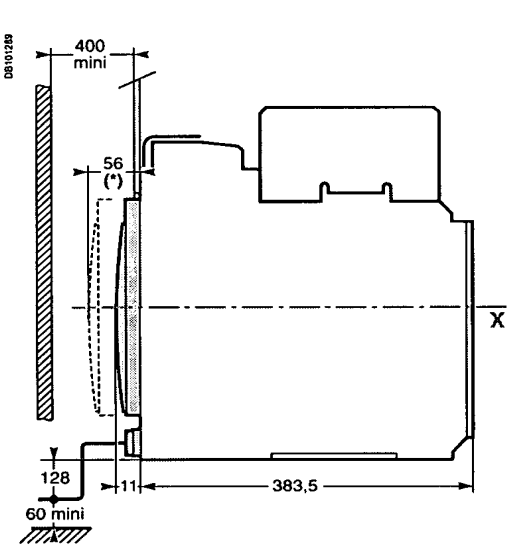


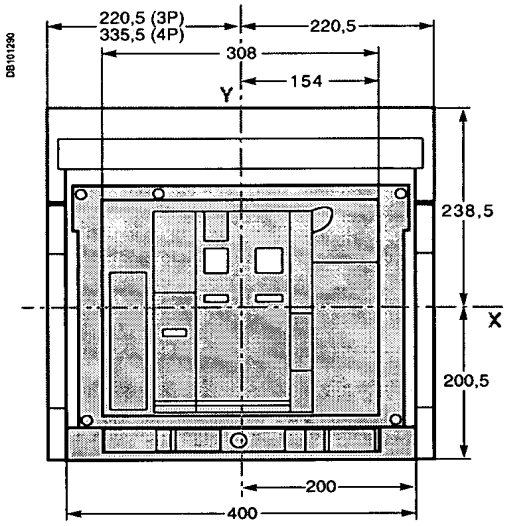
View A detail.

***Note:** recommended connection screws: **M10** class 8.8.*
*Tightening torque: **50 Nm** with contact washer.*

NW08 to NW32 circuit breakers
Drawout 3/4-poles device

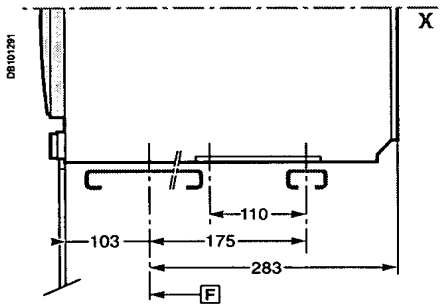
Dimensions



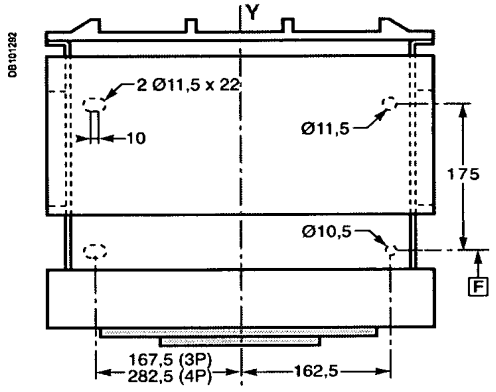


(*) Disconnected position.

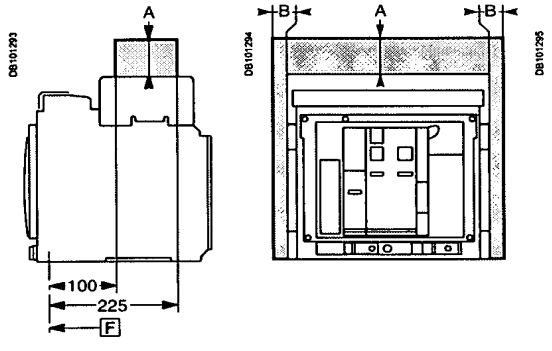
Mounting on base plate or rails



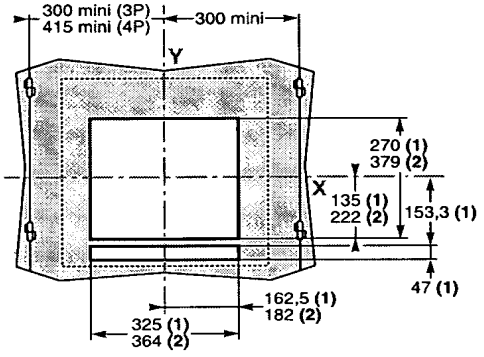
Mounting detail



Safety clearances



Door cutout



	Insulated parts	Metal parts	Energised parts
A	0	0	0
B	0	0	60

F : *datum.*

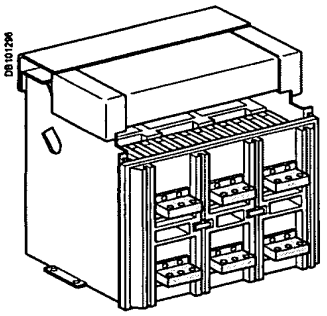
(1) Without escutcheon.
(2) With escutcheon.

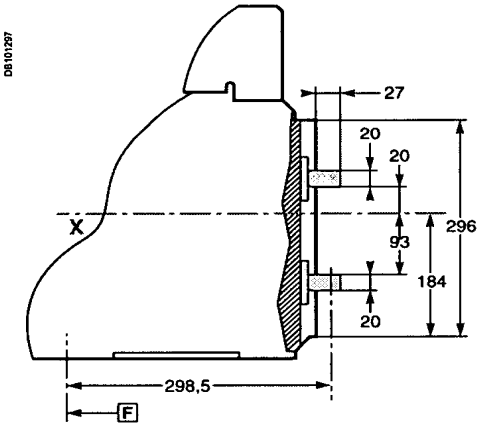
***Note:** X and Y are the symmetry planes for a 3-pole device.*

NW08 to NW32 circuit breakers
Drawout 3/4-poles device

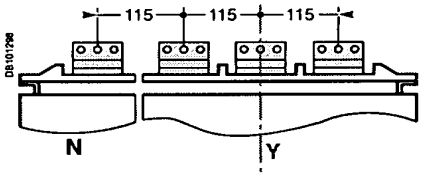
Connections

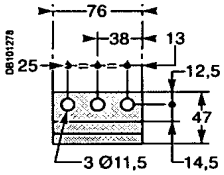
Horizontal rear connection



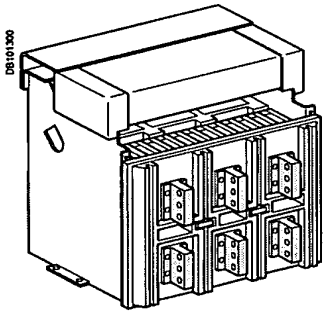


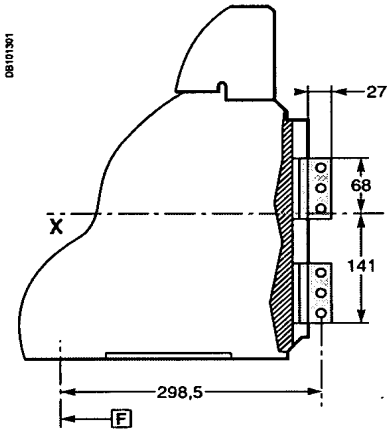
Detail



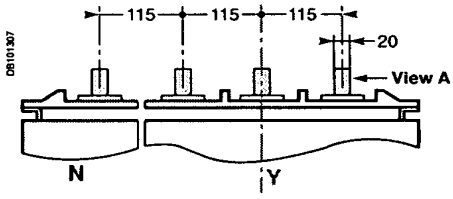


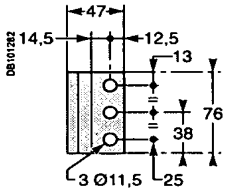
Vertical rear connection





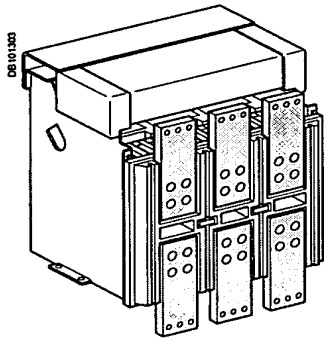
Detail

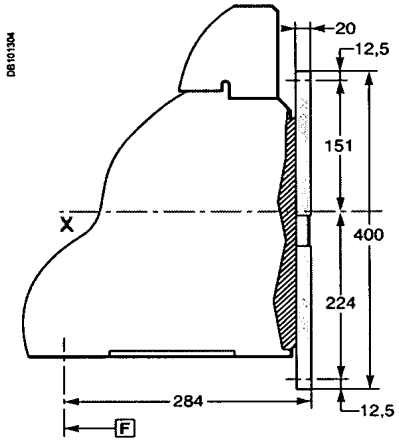




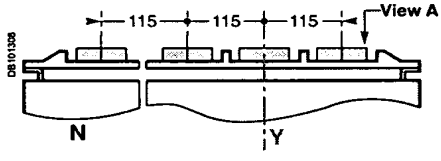
View A detail.

Front connection

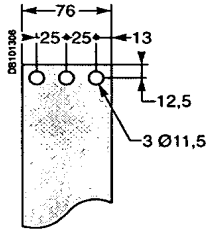




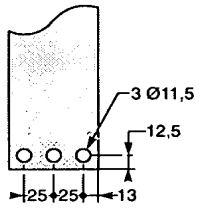
Detail



Top connection



Bottom connection

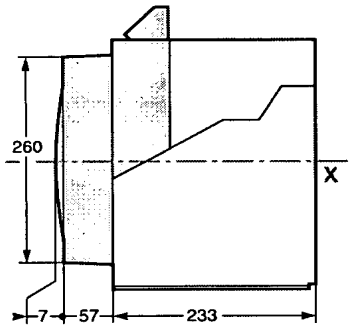


View A detail.

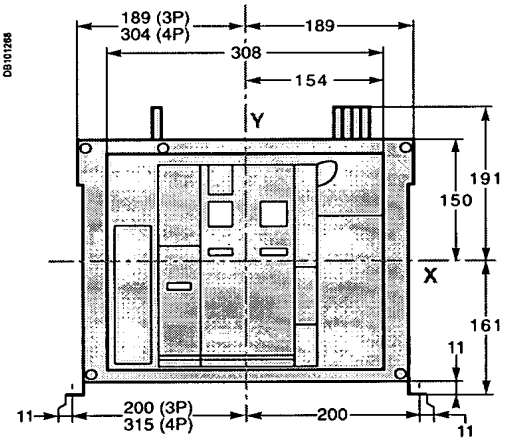
***Note:** recommended connection screws: **M10** class 8.8.*
*Tightening torque: **50 Nm** with contact washer.*

Dimensions

DB101267

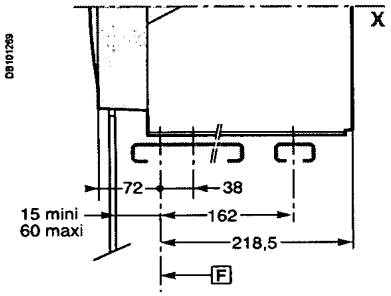


DB101268



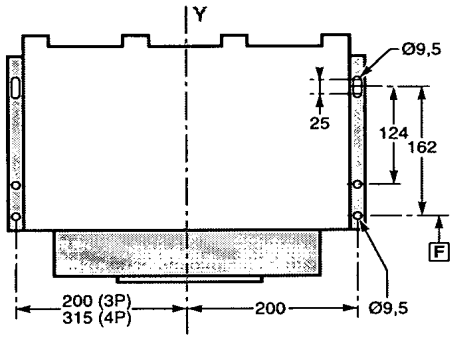
Mounting on base plate or rails

DB101269



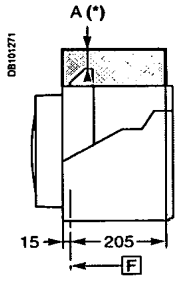
Mounting detail

DB101270

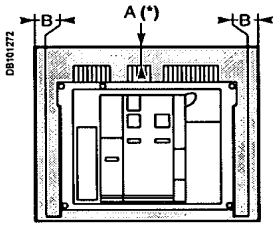


Safety clearances

DB101271

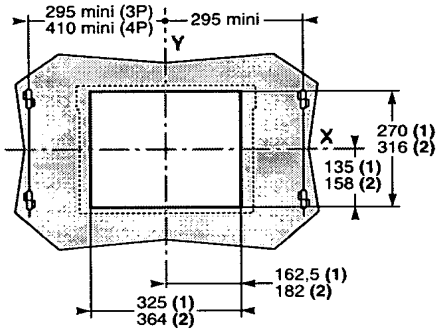


DB101272



Door cutout

DB101273



	Insulated parts	Metal parts	Energised parts
A	0	0	100
B	0	0	60

F : *datum.*

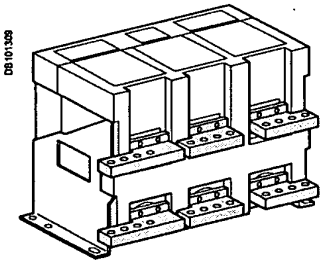
(1) Without escutcheon.
(2) With escutcheon.

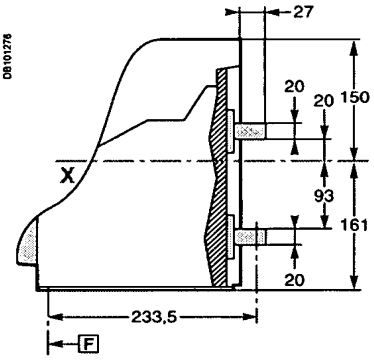
***Note:** X and Y are the symmetry planes for a 3-pole device.*
A(*) An overhead clearance of 110 mm is required to remove the arc chutes.
An overhead clearance of 20 mm is required to remove the terminal block.

NW40 circuit breakers
Fixed 3/4-poles device

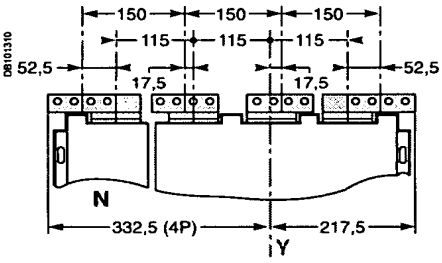
Connections

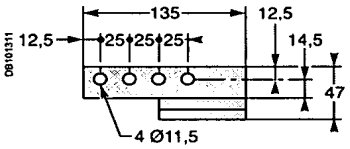
Horizontal rear connection

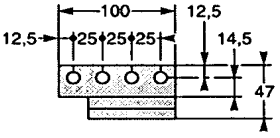




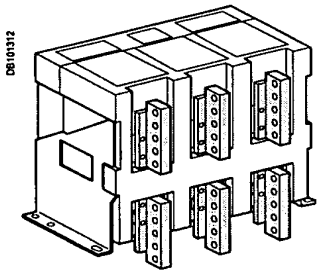
Detail

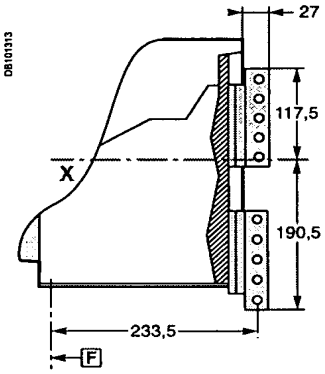




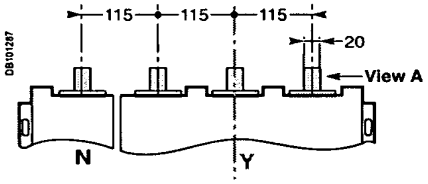


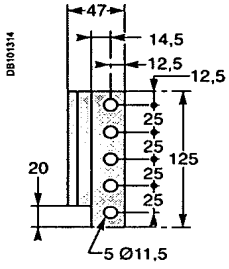
Vertical rear connection





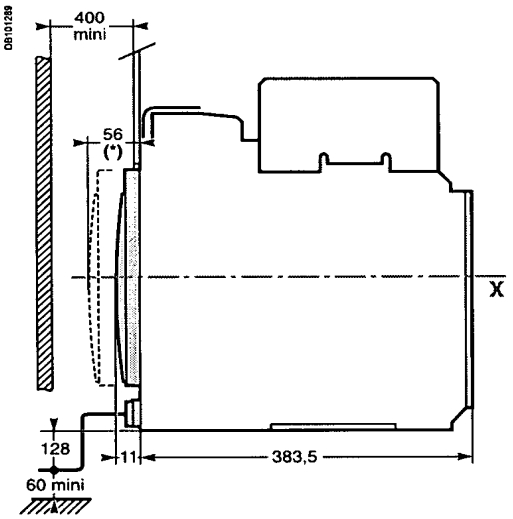
Detail

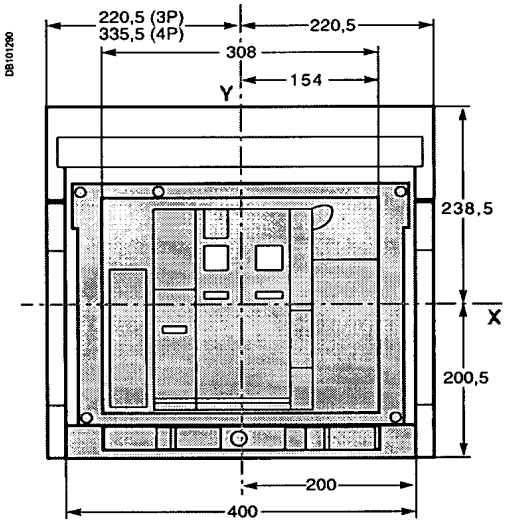




***Note:** recommended connection screws: **M10** class 8.8.*
*Tightening torque: **50 Nm** with contact washer.*

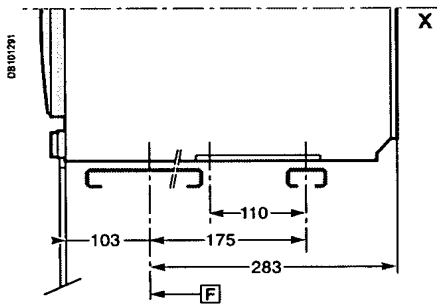
Dimensions



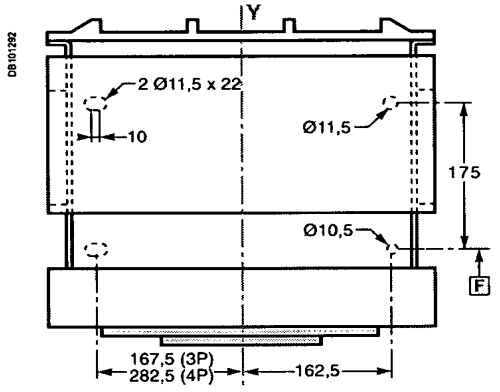


(*) Disconnected position.

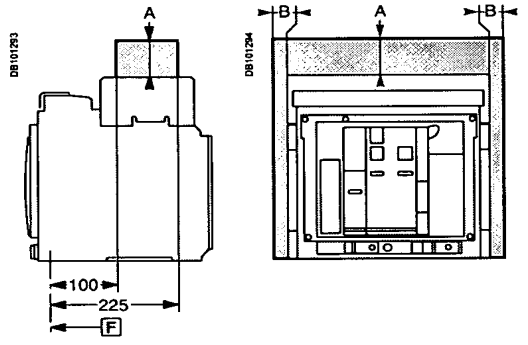
Mounting on base plate or rails



Mounting detail



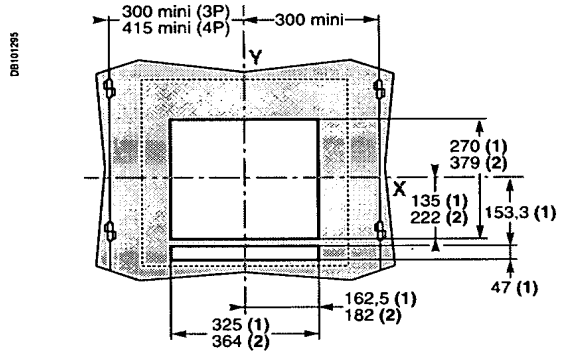
Safety clearances



	Insulated parts	Metal parts	Energised parts
A	0	0	0
B	0	0	60

F : datum.

Door cutout



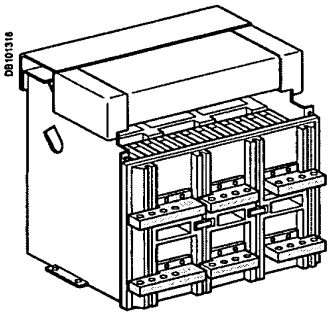
(1) Without escutcheon.
(2) With escutcheon.

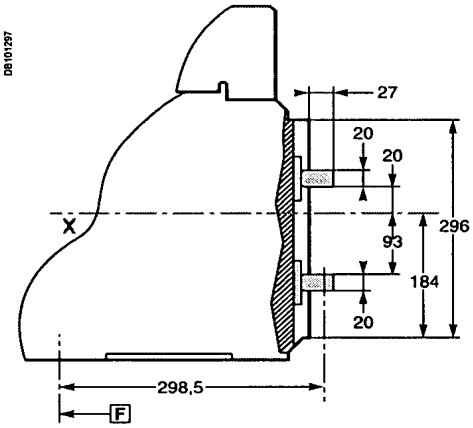
***Note:** X and Y are the symmetry planes for a 3-pole device.*
The safety clearances take into account the space required to remove the arc chutes.

NW40 circuit breakers
Drawout 3/4-poles device

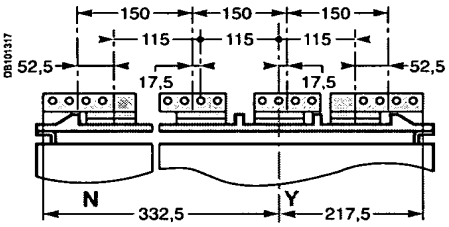
Connections

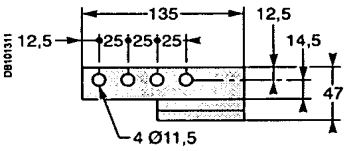
Horizontal rear connection

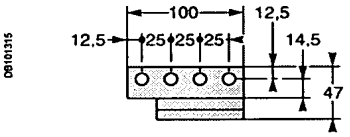




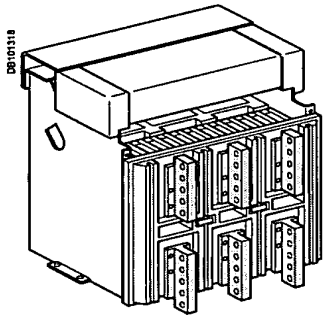
Detail

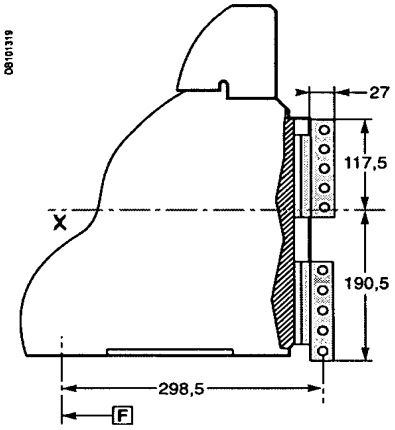


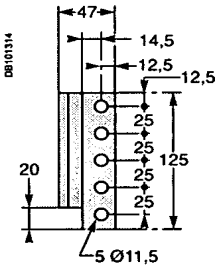




Vertical rear connection

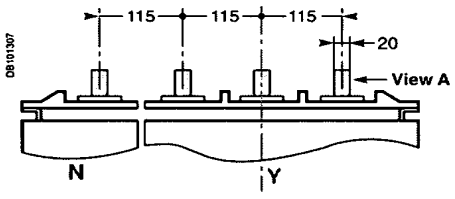






View A detail.

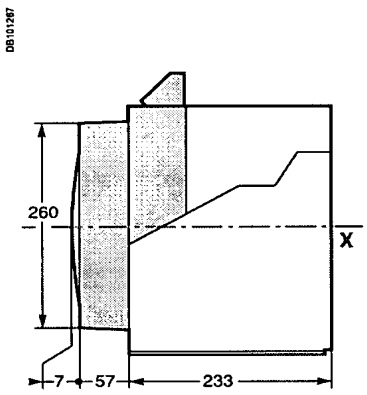
Detail

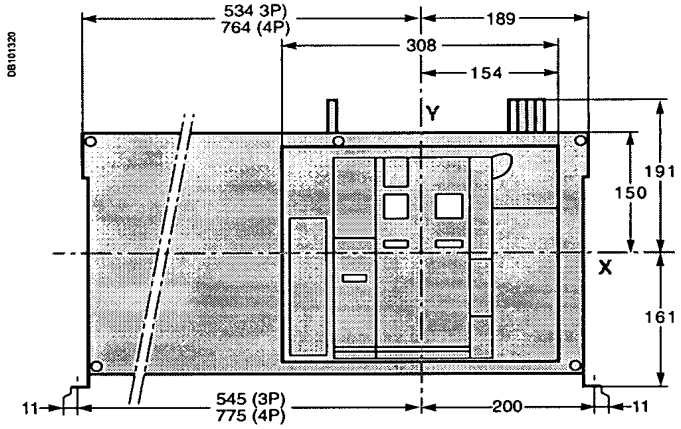


***Note:** recommended connection screws: **M10** class 8.8.*
*Tightening torque: **50 Nm** with contact washer.*

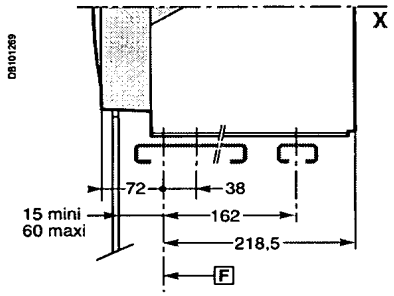
NW40b to NW63 circuit breakers
Fixed 3/4-poles device

Dimensions

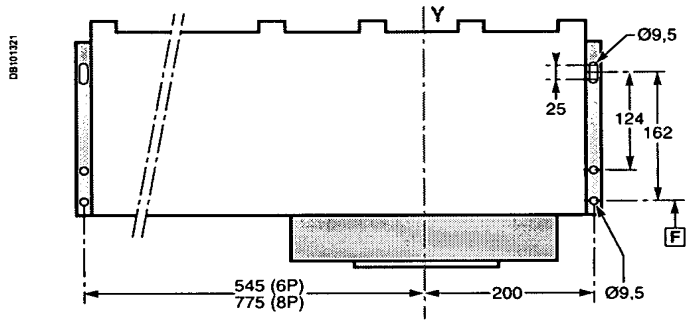




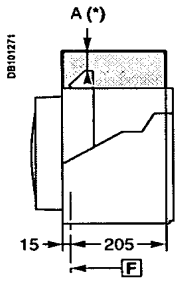
Mounting on base plate or rails

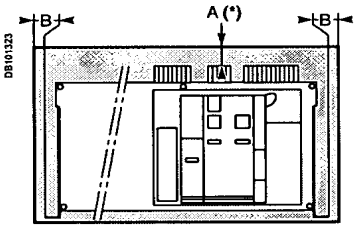


Mounting detail

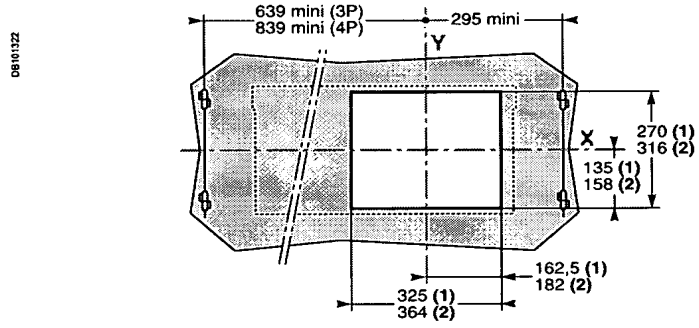


Safety clearances





Door cutout



	Insulated parts	Metal parts	Energised parts
A	0	0	100
B	0	0	60

F : datum.

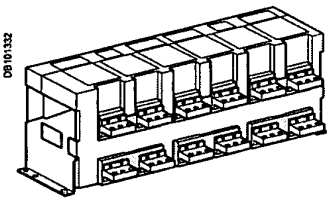
(1) Without escutcheon.
(2) With escutcheon.

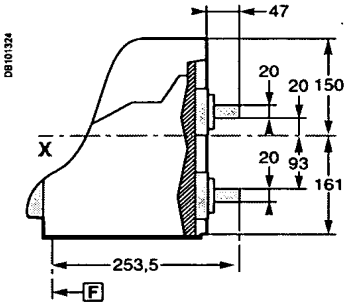
***Note:** X and Y are the symmetry planes for a 3-pole device.*
A(*) An overhead clearance of 110 mm is required to remove the arc chutes.
An overhead clearance of 20 mm is required to remove the terminal block.

NW40b to NW63 circuit breakers
Fixed 3/4-poles device

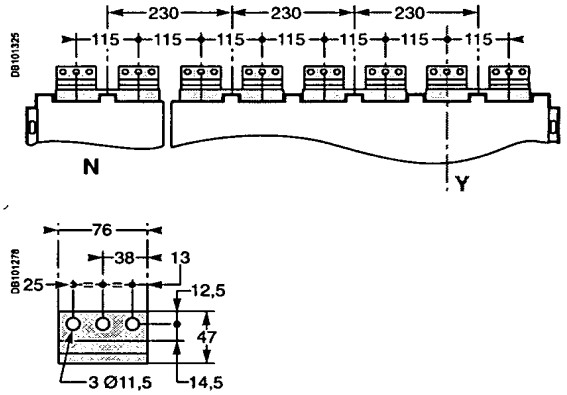
Connections

Horizontal rear connection (NW40b - NW50)

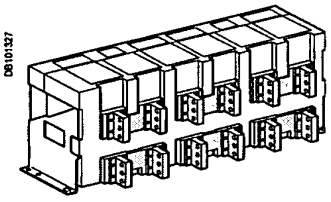


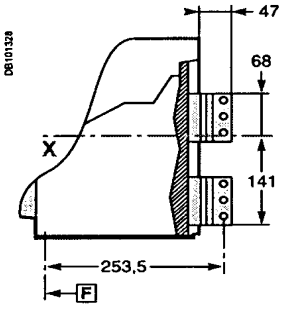


Detail

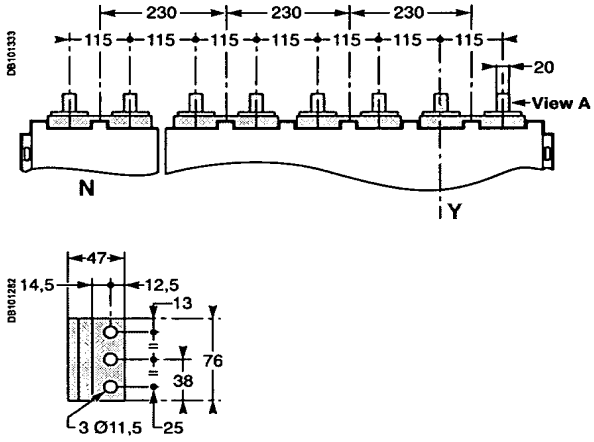


Vertical rear connection (NW40b - NW50)



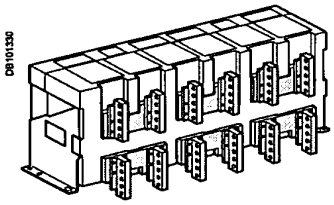


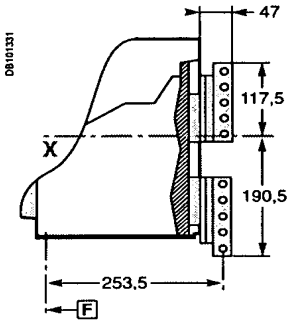
Detail



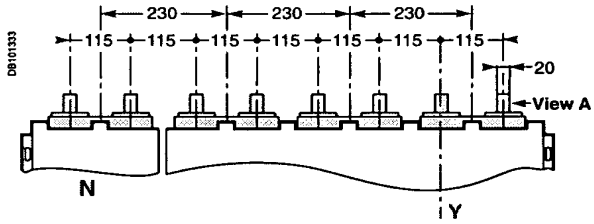
View A detail.

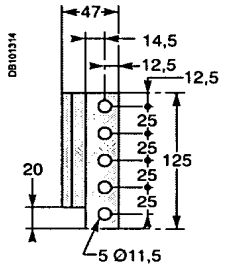
Vertical rear connection (NW63)





Detail

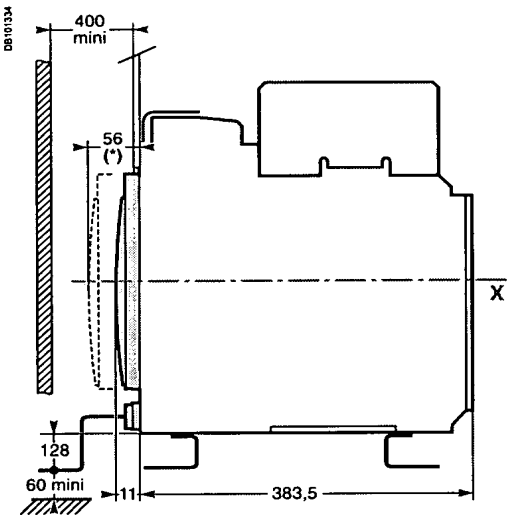




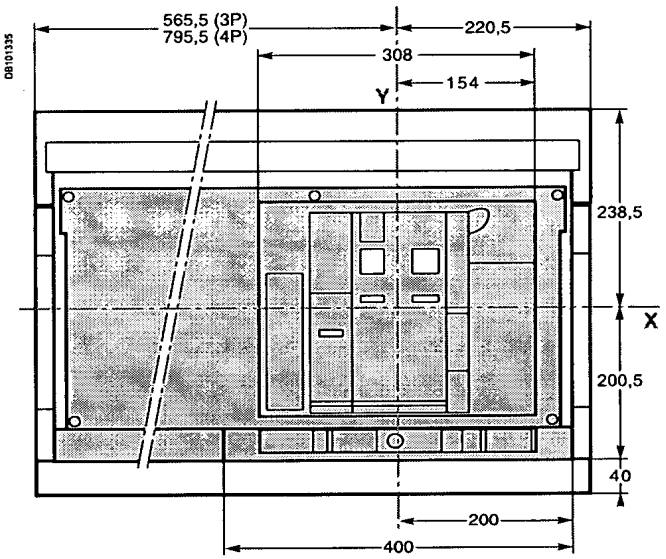
View A detail.

***Note:** recommended connection screws: **M10** s/s class A4 80.*
*Tightening torque: **50 Nm** with contact washer.*

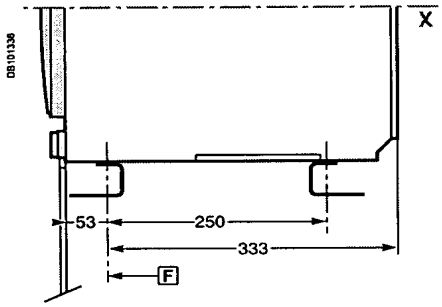
Dimensions



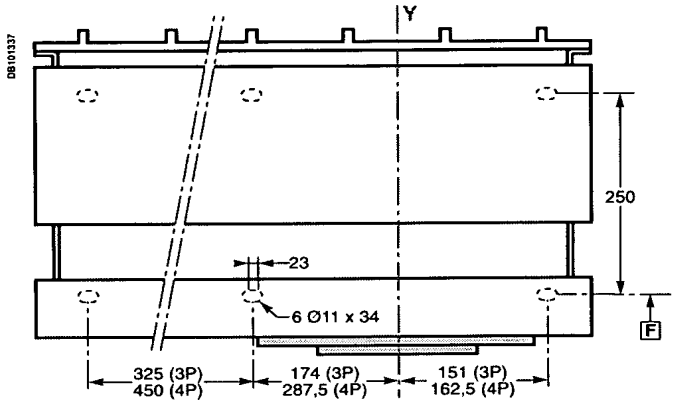
(*) Disconnected position.



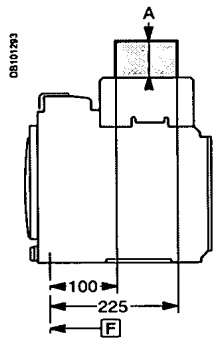
Mounting on base plate or rails

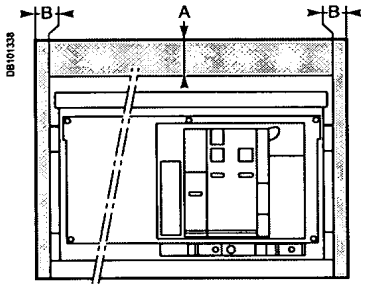


Mounting detail



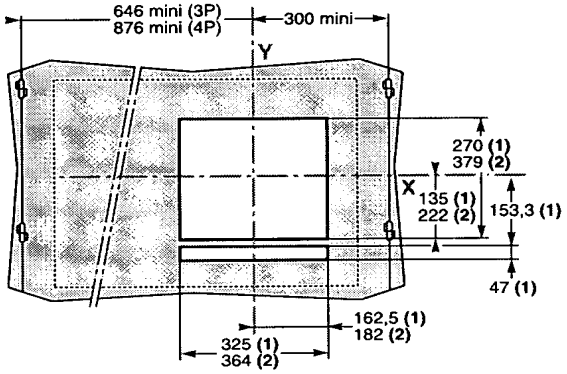
Safety clearances





	Insulated parts	Metal parts	Energised parts
A	0	0	0
B	0	0	60

Door cutout



(1) Without escutcheon.
(2) With escutcheon.

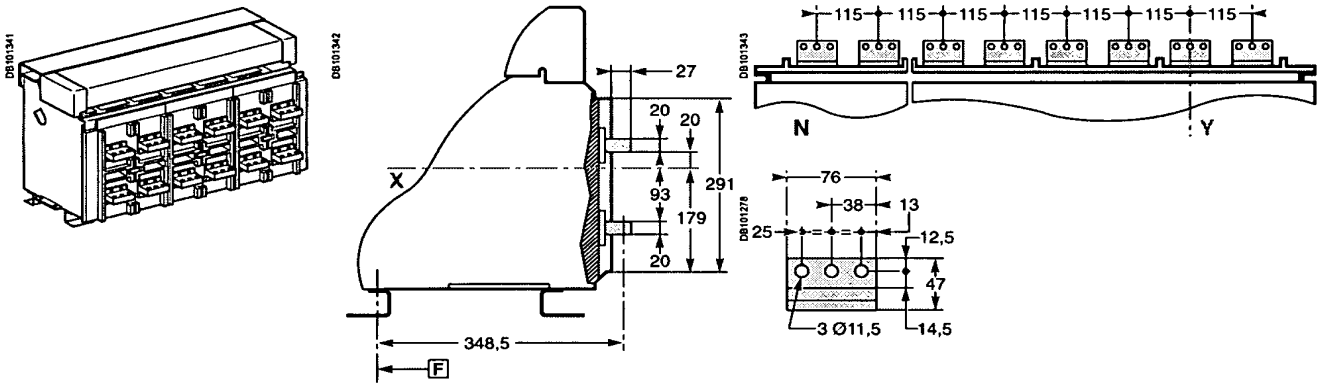
***Note:** X and Y are the symmetry planes for a 3-pole device.*

F : *datum.*

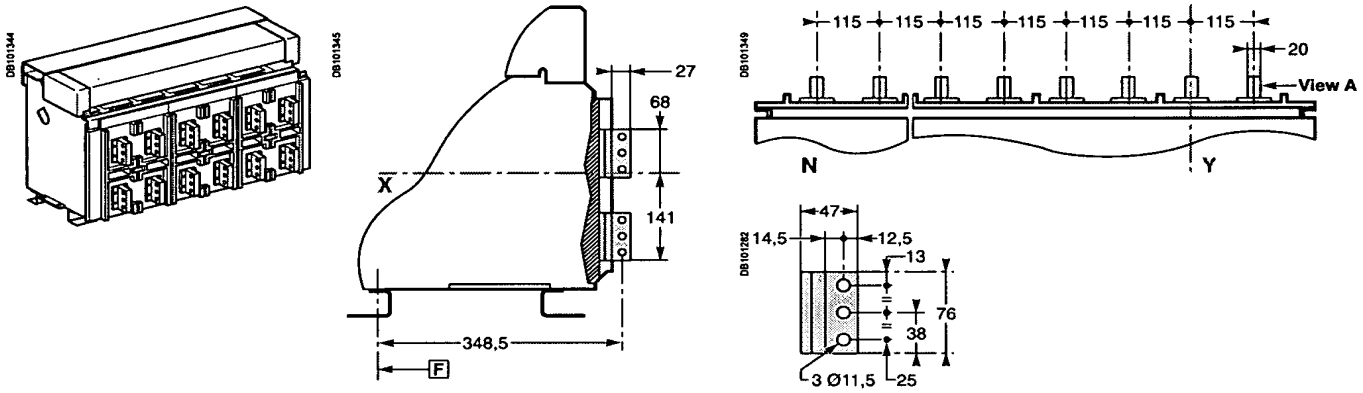
NW40b to NW63 circuit breakers
Drawout 3/4-poles device

Connections

Horizontal rear connection (NW40b - NW50) — **Detail**

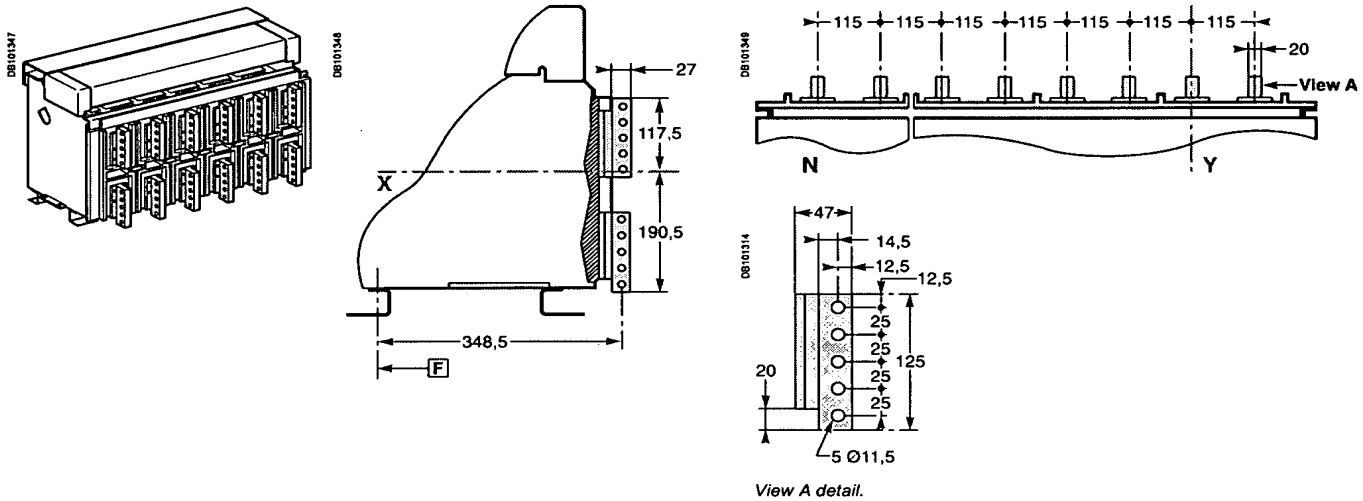


Vertical rear connection (NW40b - NW50) — **Detail**



View A detail.

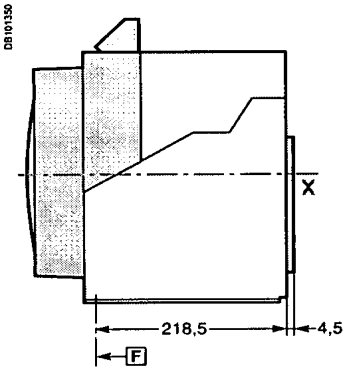
Vertical rear connection (NW63) — **Detail**

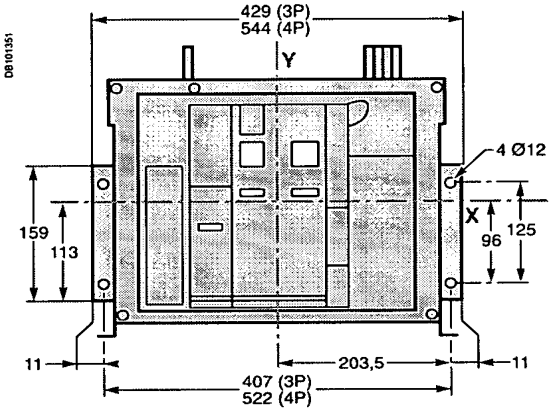


View A detail.

***Note:** recommended connection screws: **M10** s/s class A4 80.*
*Tightening torque: **50 Nm** with contact washer.*

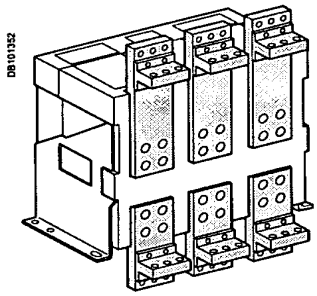
Mounting on backplate with special brackets (Masterpact NW08 to 32 fixed)

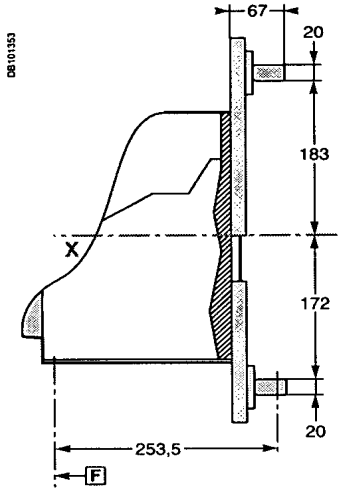




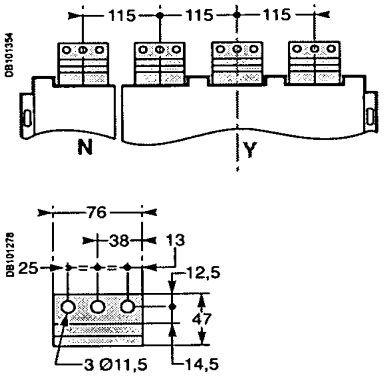
Disconnectable front-connection adapter (Masterpact NW08 to 32 fixed)

Horizontal rear connection



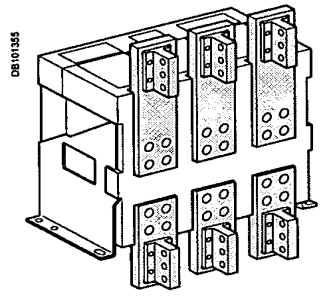


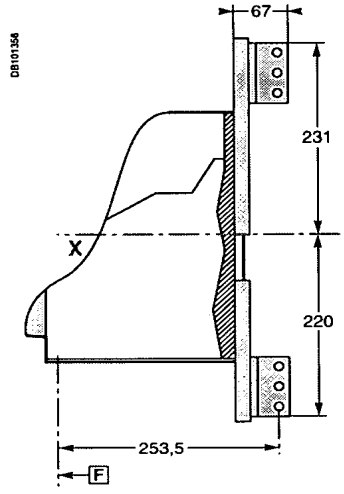
Detail



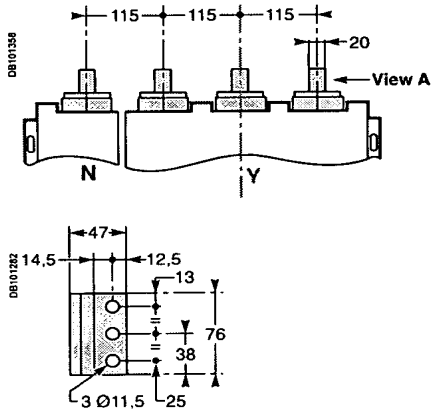
View A detail.

Vertical rear connection





Detail



View A detail.

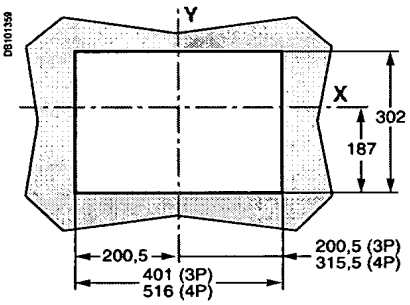
***Note:** recommended connection screws: **M10** class 8.8.*
*Tightening torque: **50 Nm** with contact washer.*

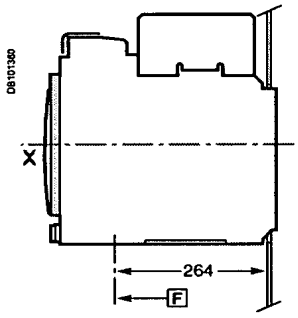
F : datum.

Rear panel cutout (drawout devices)

NW08 to NW40

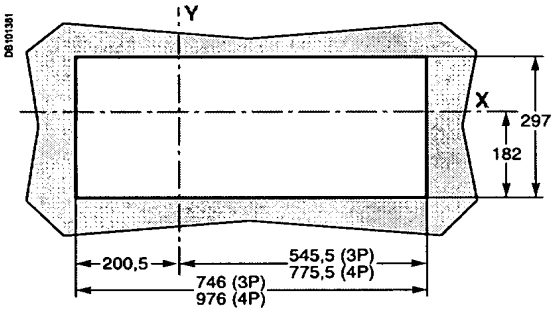
Rear view

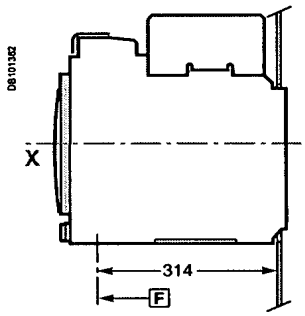




NW40b to NW63

Rear view

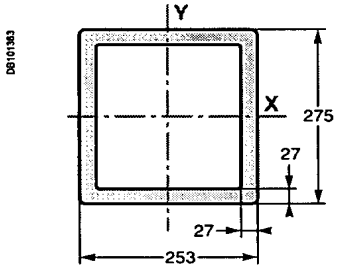




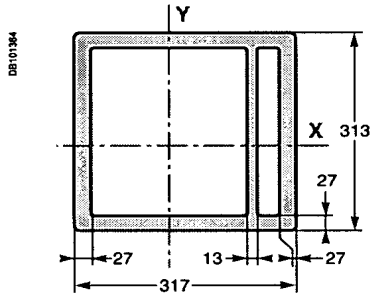
Escutcheon

Masterpact NT

Fixed device

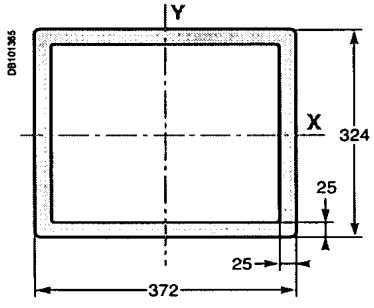


Drawout device

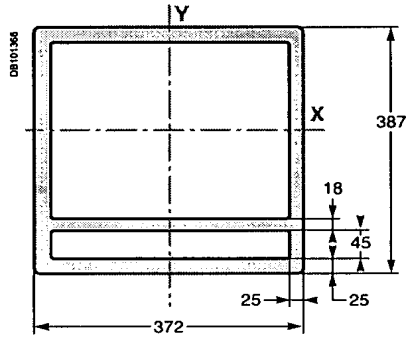


Masterpact NW

Fixed device

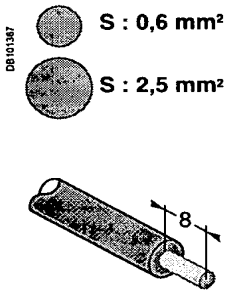


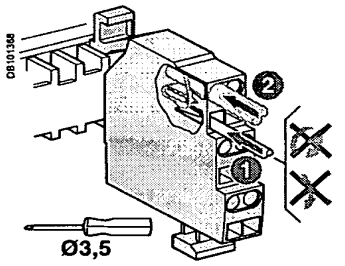
Drawout device



F : datum.

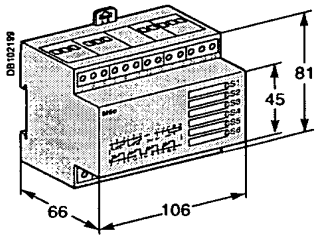
Connection of auxilary wiring to terminal block

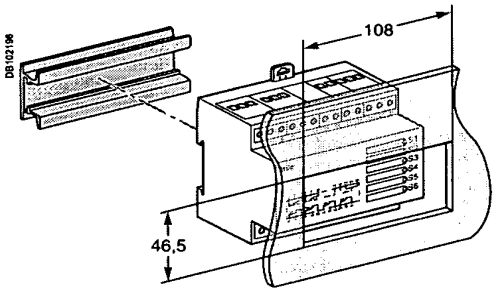




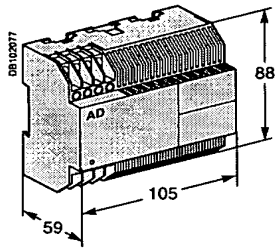
One conductor only per connection point.

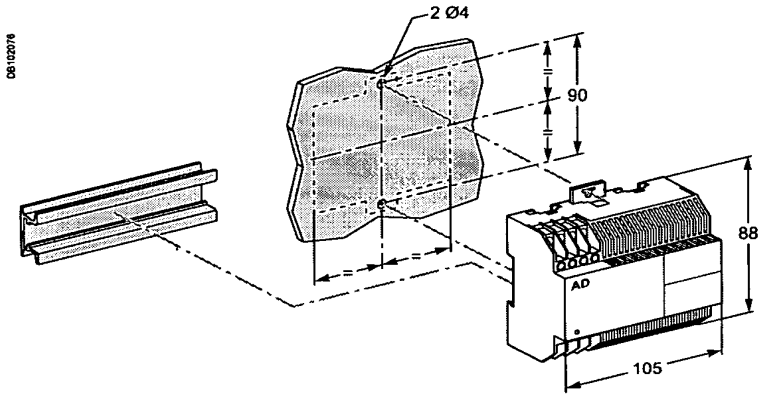
M6C relay module





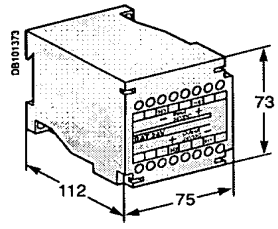
External power supply module (AD)

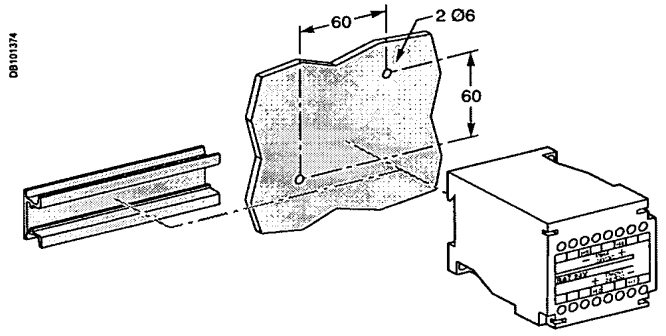




Battery module (BAT)

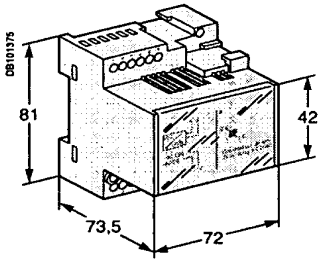
Mounting

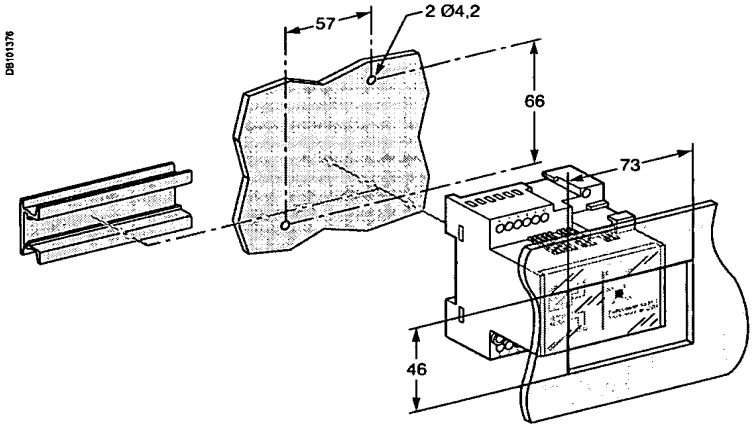




Delay unit for MN release

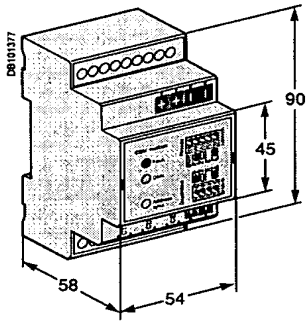
MNR



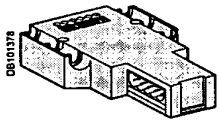


"Chassis" communication module

ModBUS

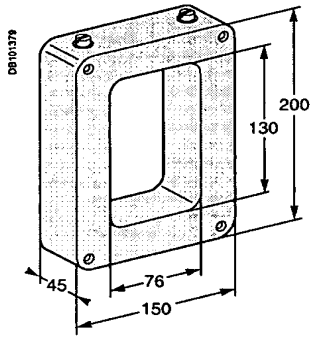


BatiBUS

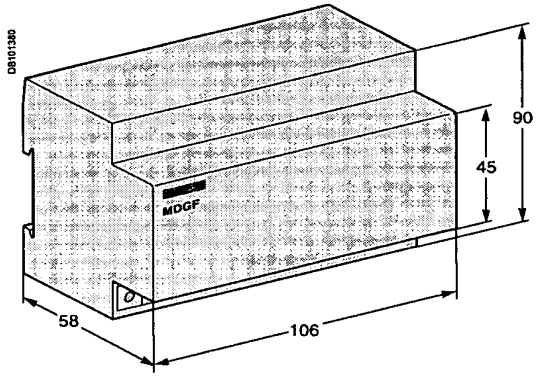


External sensor for source ground return (SGR) protection

Sensor



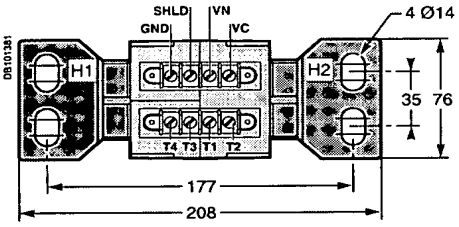
"MGDF summer" module



External sensor for external neutral

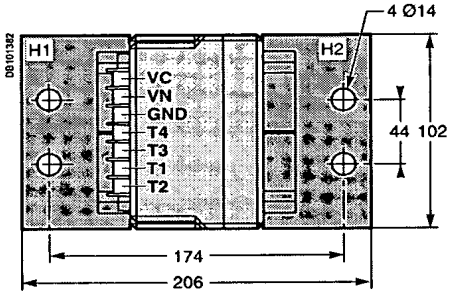
Dimensions

400/1600 A (NT06 to NT16)



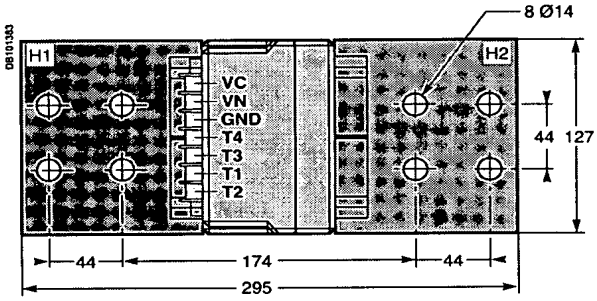
High: 137 mm.

400/2000 A (NW08 to NW20)



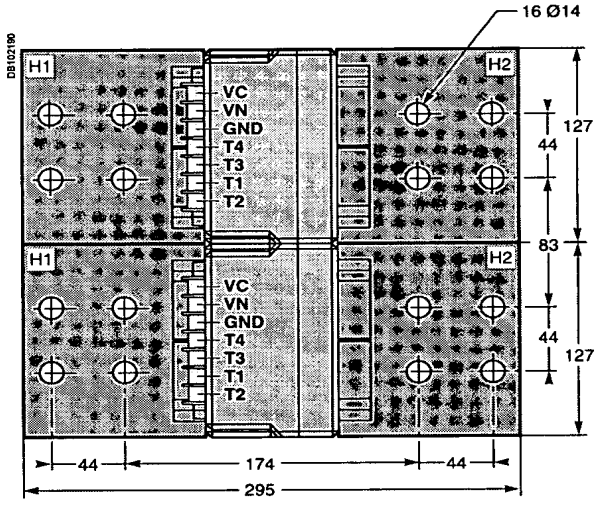
High: 162 mm.

1000/4000 A (NW025 to NW40)



High: 162 mm.

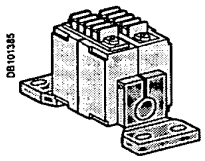
2000/6300 A (NW40b to NW63)



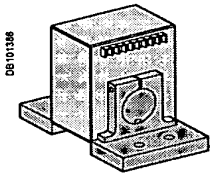
High: 168 mm.

Installation

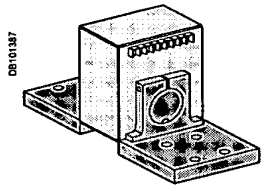
400/1600 A (NT06 to NT16)



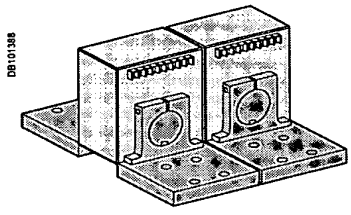
400/2000 A (NW08 to NW20)



1000/4000 A (NW025 to NW40)



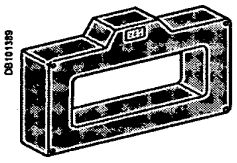
2000/6300 A (NW40b to NW63)

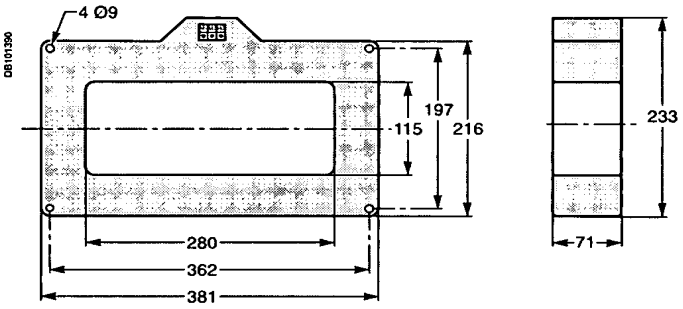


2 identical external sensor shipped as loosed part.

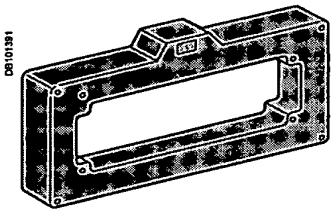
Rectangular sensor for earth leakage protection (Vigi)

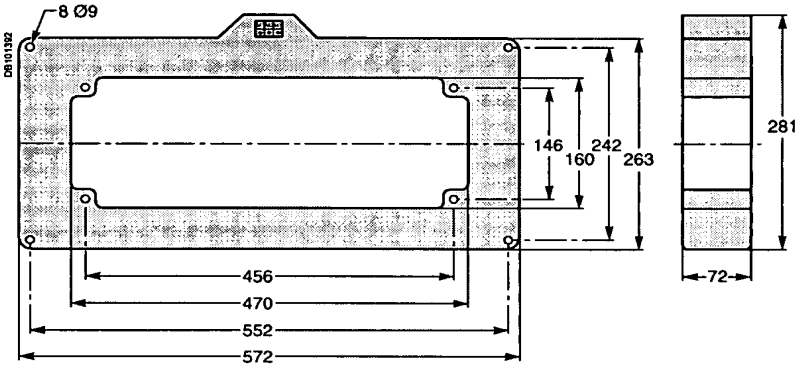
280 x 115 mm window





470 x 160 mm window

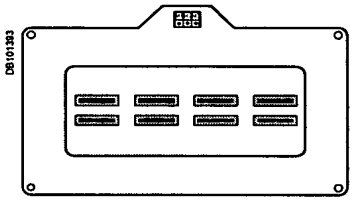




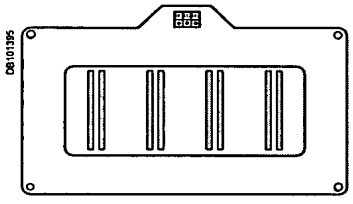
Busbars	I < 1600 A	I < 3200
Window (mm)	280 x 115	470 x 160
Weight (kg)	14	18

Busbars path

280 x 115 window
Busbars spaced 70 mm centre-to-centre

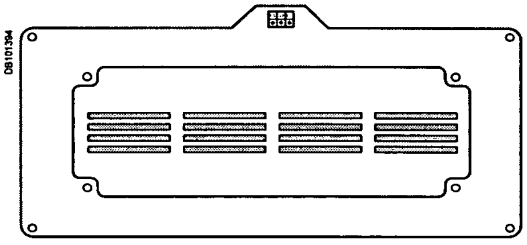


2 bars 50 x 10.

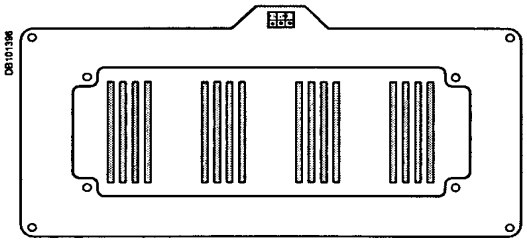


2 bars 100 x 5.

470 x 160 window
Busbars spaced 115 mm centre-to-centre



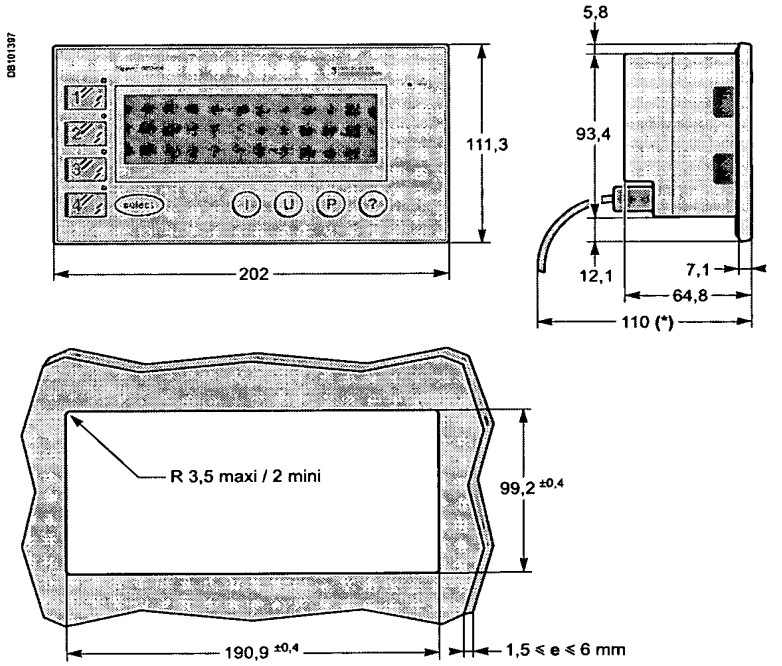
4 bars 100 x 5.



4 bars 125 x 5.

Installation and connection for Digipact DMB300

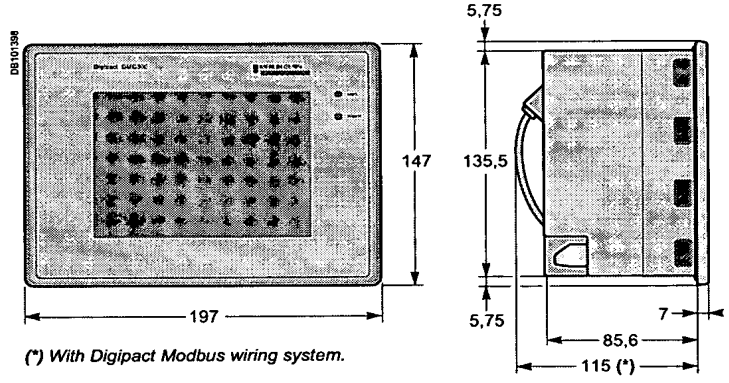
Dimensions and front-panel cut-out



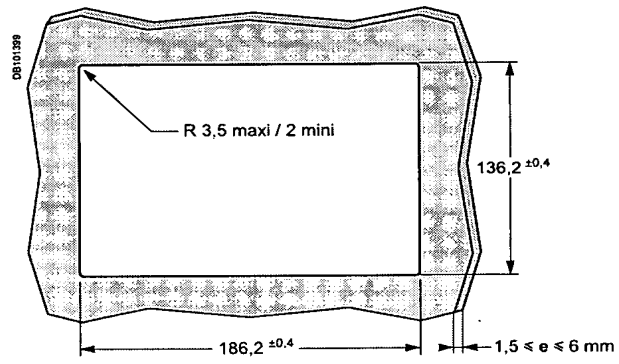
(*) With Digipact wiring system.

Installation and connection for Digipact DMC300

Dimensions and front-panel cut-out

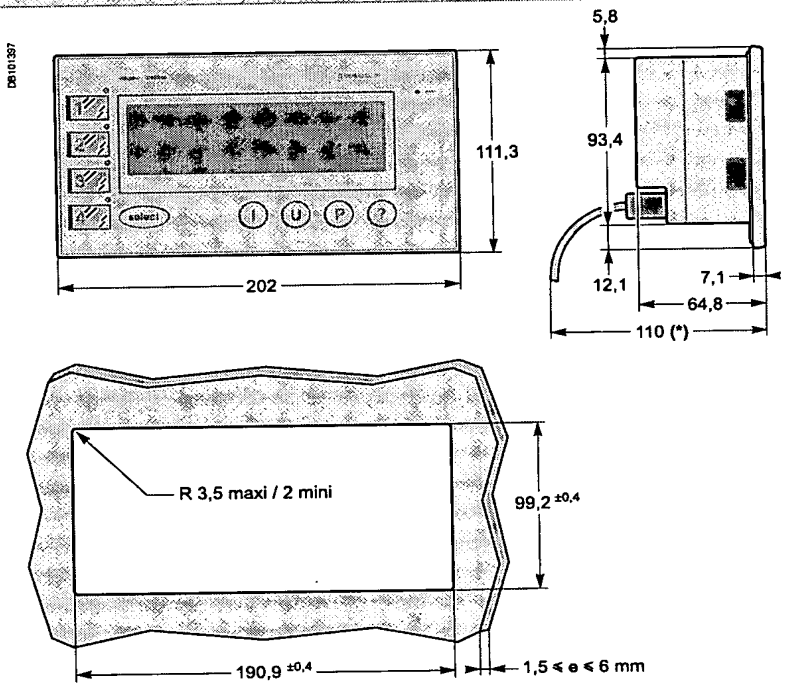


(*) With Digipact Modbus wiring system.



Installation and connection for Digipact DMB300

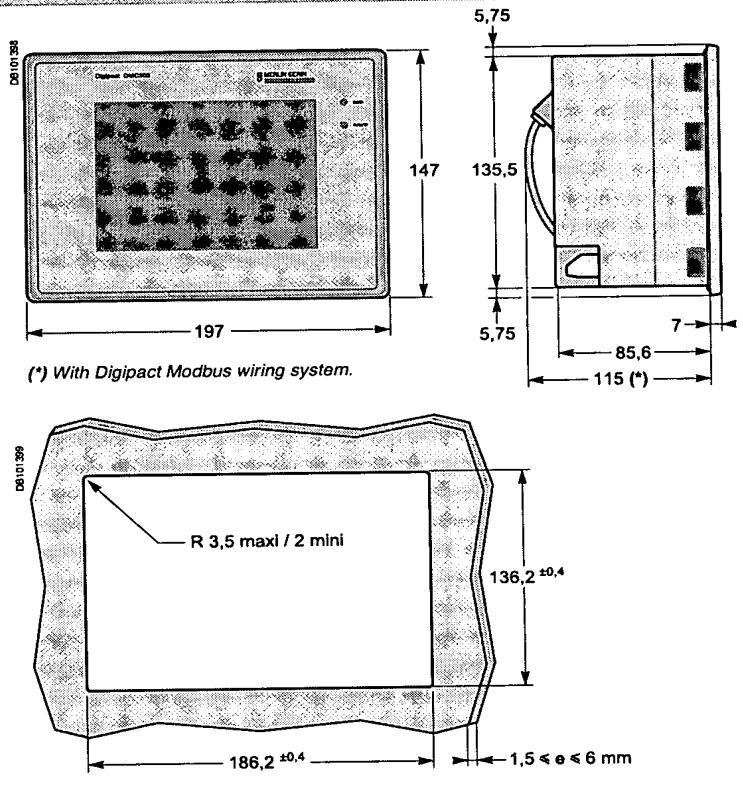
Dimensions and front-panel cut-out



(*) With Digipact wiring system.

Installation and connection for Digipact DMC300

Dimensions and front-panel cut-out



(*) With Digipact Modbus wiring system.

Schneider Electric Industries SAS
89, boulevard Franklin Roosevelt
F - 92500 Rueil-Malmaison (France)
Tel : +33 (0)1 41 29 85 00

http://www.schneider-electric.com

This document has been printed on ecological paper.

Design: Schneider Electric - Ameg
Photos: Schneider Electric
Printed:

07-2004

ART56504